Habitats and plant diversity of Al Mansora and Jarjr-oma regions in Al- Jabal Al- Akhdar- Libya

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Abstract: Study conducted in two areas of Al Mansora and Jarjr-oma regions in Al- Jabal Al- Akhdar on the coast. The Rocky habitat Al Mansora 6.5 km of the Mediterranean Sea with altitude at 309.4 m, distance Jarjr-oma 300 m of the sea with altitude 1 m and distance. Vegetation study was undertaken during the autumn 2010 and winter, spring and summer 2011. The applied classification technique was the TWINSPAN, Divided ecologically into six main habitats to the vegetation in Rocky habitat of Al Mansora and five habitats in Jarjr oma into groups depending on the average number of species in habitats and community: In Rocky habitat Al Mansora community vegetation type *Cistus parviflorus*, *Erica multiflora, Teucrium apollinis*, *Thymus capitatus, Micromeria Juliana, Colchium palaestinum* and *Arisarum vulgare*. In Jarjr oma existed five habitat Salt march habitat Community dominant species by *Suaeda vera*, Saline habitat species *Onopordum cyrenaicum*, Rocky coastal habitat species *Rumex bucephalophorus*, Sandy beach habitat species *Tamarix tetragyna* and Sand formation habitat dominant by *Retama raetem*. The number of species in the Rocky habitat Al Mansora 175 species while in Jarjr oma reached 19 species of Salt march habitat and Saline habitat 111 species and 153 of the Rocky coastal habitat and reached to 33 species in Sandy beach and 8 species of Sand formations habitat. Species richness increased in the spring and winter, and say in summer and autumn and decreased index diversity in the spring and winter, note that the greater the diversity index is less diversity. Highest species richness in Rocky coastal habitat followed Saline habitat, but low species richness Sand formation, Sandy beach and Salt march habitats, respectively in all seasons especially summer and autumn season. Increased species richness and Shannon index during spring and winter. The highest value of 18.9 D and 18.2 C, Saline and Rocky coastal habitats respectively during spring season in Jarjr oma. Found an inverse relationship between species richness and diversity the more richness low diversity index and the correlation is weak and significant and gave Simpson and Shannon index a strong correlation and an inverse but not significant in autumn season, whiles in winter, there is a weak correlation and significant inverse relationship between species richness and diversity and a strong correlation significant and positive relationship between species richness and Shannon index and vice between Shannon index and diversity. In spring season a significant positive correlation between diversity index and Simpson, inverse a strong correlation between richness and Simpson. Gave the highest similarity coefficient Jaccard's in Jarjr-oma between Rocky coastal and Saline by 39%, while the Rocky habitat in Al-Mansora which altitude 309.4 meters and Jarjr-oma altitude 1 meter gave Jaccard's coefficient of 22.6%, while given lower coefficient Jaccard's Jarjr-oma between Sand formation, Sandy Beach and Rocky Coastal habitats and there is no common types between Sand formation and both Rocky coastal and Salt march. In community*Thymus capitatus* gave highest silt, sand, EC, NaCl, Cl and Ca of Rocky habitat Al-Mansora. While, in Salt march and Rocky coastal gave *Suaeda vera* highest Clay. Salt march gave highest EC, NaCl, Na and Ca.

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Key words: plant diversity, Species richness, Habitats, Rocky, Salt march, Saline, Sandy beach and Sand formation

1. Introduction

The Mediterranean contains several major concentrations of plant diversity sometimes called 'hotspots', as noted above, houses around 25000 species of flowering plants. It is difficult to give precise figures because no overall floristic assessment of the region has been completed, although a complete catalogue', Med-Checklist is in progress (Greuter *et al.,* 1984,1986,1989). The Mediterranean region is one of the world's major centres of plant diversity containing 11 of the 231 centres selected for their global importance, Centres of plant diversity in the Mediterranean region North Africa, were in Al Jabal Al Akhdar (Libya) and High Atlas (Morocco) (Davis *et al.,* 1994). The total number of vascular plant species in Libya varied between 1900 and 2059 as indicated by World Conservation Monitoring Centre, 1992. Al-Jabal Al-Akhdar region is relatively rich and varied, and the number of species reach about 1100 species (Boulos, 1972 and Al-Jabal Al-Akhdar south project, 2005).

Species diversity is an old and popular concept in ecology, that has been used to characterize communities and ecosystems (El-Darier, 1994). Species Richness is a relative term that refers to the number of species in a community, and is directly associated with measuring the diversity of species in a given area. A related term, evenness, is another dimension of diversity that defines the number of individuals from each species in the same area. Together, these terms have been used to describe species diversity patterns on Earth (Wikibooks, 2009). These comprise species richness, the prevalence of characteristic vegetation or the structural variety of the terrain, the presence of special sites, and dynamics (for screes) (**Schröder *et al*., 2006**).

Species richness and Simpson's index of diversity in spring increased than in autumn in all sites of both years in Mediterranean Sea (**El-Zanaty *et al.,* 2010**).

The changes of vegetation community diversity in different habitats were obvious, furthermore, for the four habitat factors, significant correlations between slope aspect and vegetation diversity (**Mi *et al.*, 2012**). Species diversity is an important feature of community structure, not only reflects species richness and evenness of community. A diversity index has characterized community composition as an important indicator (**Magurran, 1988**). Any measure of diversity depends on the approach used to identify and classify the objects for which an evaluation of diversity is required. This is the main reason why the search for the most "natural" taxonomic system in natural history and biological sciences has been a hot topic since Linnaeus, if not since Aristotle (**Tagliapietra and Sigovini, 2010**).

Considering that the Al-Jabal Al-Akhdar has a high diversity of plant species that are still poorly studied, also survey and identify possible links between a species and its habitat. The main objective of the present work is to examine the survey and study plant species to the flora of Al Jabal Al Akhdar in Libya include two regions within five habitats to: test for patterns in species richness and diversity. The relationship between edaphic factor and ecological factors which affect distribution diversity of the plant communities on habitats.

The study area

The study area is located in the Mediterranean Coast of Libya (Figure 1). The Rocky habitat Al-Mansora between latitude 32°, 50′, 44.8″ N and longitude 21°, 50′, 30.3″ E. Al-Mansora distance 11 Km east Al Baida city and Jarjr-oma between latitude 32°, 47′, 49.8″ N and longitude 21°, 26′, 40.6″ E, distance 28 km west Al Baida city, three transect were investigated from north to south. Distance Jarjr-oma 300 m of the sea with altitude 1 m and distance Al Mansora 6.5 km of the Mediterranean Sea with altitude at 309.4 m.

2. Material and Methods

Data Collection: Vegetation study was undertaken during the autumn 2010 and winter, spring and summer 2011. A total of 24 stands in all season were sampled from Al Mansoura and Jarjr-oma from Al- Jabal Al-Akhdar (Figure 1). Stands and sites were selected as to represent the variation of vegetational, climatic and edaphic characteristics prevailing in the study area so that the location of stands was based on visual changes in habitats and plant communities along the transect. Examples of habitat classes include habitat types derived from Electric Conductivity (EC) classification schemes, habitat salinity EC from 6 – 9 ms/cm and habitat saltmarch from 11-36 ms/cm.

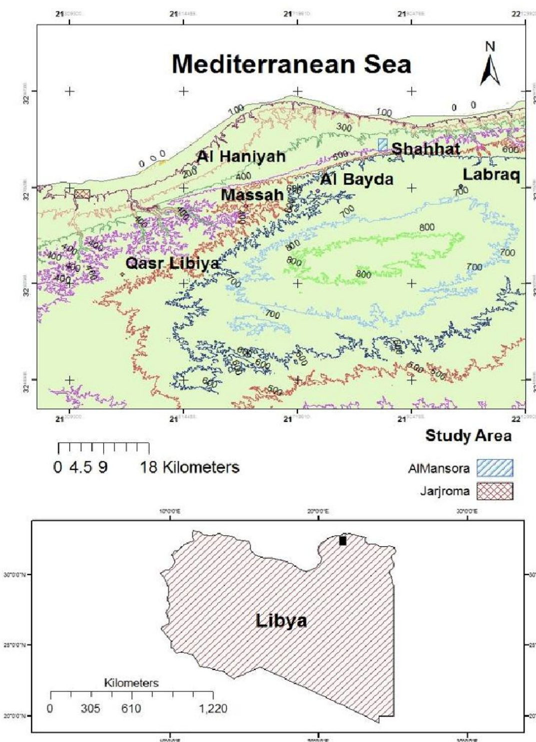


Fig. 1. Map of the Western Mediterranean Sea coast region of Libya indicating the location of Al Mansora and Jarjr oma in Al- Jabal Al- Akhdar.

The floristic categories and chorology of species recorded in the study area were made with their characteristic distribution terms, the plant species were identified according to Boulos (1999, 2000, 2002 and 2005) and Jafri and El-Gadi (1977).

Three line transects at Al Mansoura and Jerjr-oma were chosen for this study. The take 500 meters for each transect the number of three transects and all transect four stands with an area of 5*5 m^2. In these stands, the quadrate method was used and the size of each analytic quadrate area was 1 m^2. The stands were selected on the basis of visual difference and change in their vegetation coverage. The first step to calculating the index is to sample an area. Random sampling is a way to collect data in a manageable fashion rather than counting every plant. The species in each quadrate were listed. The number of individual of each species was counted. Number of species counted for each area and for each habitat were determined each 25 m^2 by community and habitat.

Species diversity, which sometime called species heterogeneity, is a characteristic unique to the community level of the biological organization. It is an expression of community structure. It estimated as the following (Simpson, 1949):

$$\text{Diversity} = \frac{\sum_{i=1}^{M} n_i (n_i - 1)}{N(N-1)}$$

M = species, which we will label as species 1, 2 …, M.

ni = individuals in species i. or the total number of organisms of a particular species.

N = the total number of organisms of all species.

Index of diversity increases diversity decreases.

The Shannon-Wiener Index (H') (MacArthur and Macarthur, 1961)

Were determined in each stand then, for the different transects as follows:

The Shannon-Wiener Index

$$H' = \sum_{i=1}^{n} Pi \times \ln(Pi)$$

Where s = number of species, Pi = proportion of the importance value of species in the community made up of s species with known proportions P1, P2, P3,.. Pn

Simpson’s reciprocal index (C) (Simpson, 1949).

$$C = \sum_{i=1}^{n} Pi^2$$

Simpson's reciprocal index the higher the value, the greater the diversity. The maximum value is the number of species (or other category being used) in the sample.

In studies reporting diets of several species in a local area, we also calculated similarity indices to determine dietary overlap in different regions for a given species and for adifferent species within the same region.

Jaccard’s coefficient = (The number of species common to the two habitat) / (The total number of species on the two habitat) x 100 (**Williams and Sc., 1949**).

Jaccard’s coefficient of floral community is dependent on the between numbers of individuals and numbers of species in the communities, the higher the value of the coefficient the closer the similarity between the two habitat

Data Analysis: Classification and ordination of communities (stands) followed two trends of multivariate analysis. The applied classification technique here was the Two-Way Indicator Species Analysis (TWINSPAN), a CAP Program (Henderson and Seaby, 1999). The applied PCA (principal components analysis) correlation ordination diagram between the different soile variables to stands with vegetation groups from TWINSPAN classification of the vegetation using CAP Program. The statistical treatments applied were according to Nie *et al*, 1975.

3. Results

Rocky habitat Al Mansoura

Species diversity: Figures 2-5 and tables 3 & 4 demonstrates the differences in species richness**,** Diversity index, Simpson and Shannon index (H'), where the lowest value of species richness is recorded in summer season, while the highest value of 15.3 and 18.6 species are scored in group B and G, respectively during spring season.

Increased of diversity index in autumn season, while, decrease in spring, reaching to 0.008 and 0.09 in group A and G, respectively, during spring season. Note that the greater the diversity index the less diversity.

Simpson's reciprocal index the higher the value in autumn, the maximum value is 0.89 in group E during winter season in Rocky habitat Al Mansora area. Shannon index lower values appeared in autumn season compared to the rest of the seasons.

Species richness increased in the spring and winter, and say in summer and autumn and decreased index of diversity in the spring and winter and the highest richness of the species of group B and C in the spring as the richness species to 19.

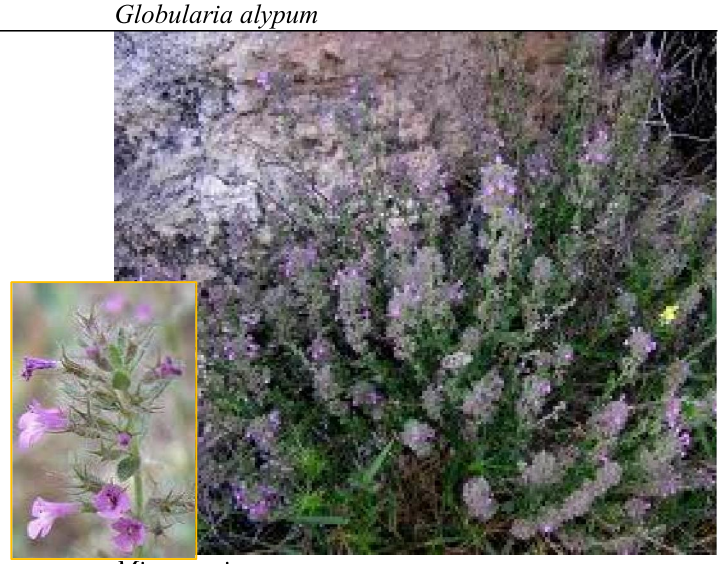
Found an inverse relationship between species richness and diversity the more richness low diversity index and the correlation is weak and significant -0.39, and gave Simpson and Shannon index a strong correlation and an inverse but not significant in autumn season, whiles in winter, there is a weak correlation and significant inverse relationship between species richness and diversity and a strong correlation significant and positive relationship between species richness and shannon and vice between shannon and diversity, In spring positive and significant relationship between diversity index and simpson, inverse a strong between richness and simpson.

The applied classification technique here was the Two-Way Indicator Species Analysis (TWINSPAN), divided the vegetation in Rocky habitat Al Mansora in autumn season into groups depending on the average number of species in each group: Group A this vegetation type *Cistus parviflorus*, association *Anagallis arvensis*, *Globularia alypum* and *Pistacia lentiscus*. Group B this vegetation type comprises *Erica multiflora* which attained the highest density. The indicator species are *Micromeria nervosa* and *Phagnlon rupestre*. Group C species *Teucrium apollinis* association *Sedum sediforme* and *Viola scorpiuroides*. Groups D comprises *Thymus capitatus* association *Bellevalia sessiliflora*, *Drimia maritime* and *Sarcopoterium spinosum*. Group E vegetation of this community the dominant species *Micromeria juliana* associated *Asphodelus microcarpus*. Group F dominant by *Colchium palaestinum* associated *Lotus cytisoides*. Group G *Arisarum vulgare* associated with *Galium verrucosum*.

Cistus parviflorus

Globularia alypum

Erica multiflora

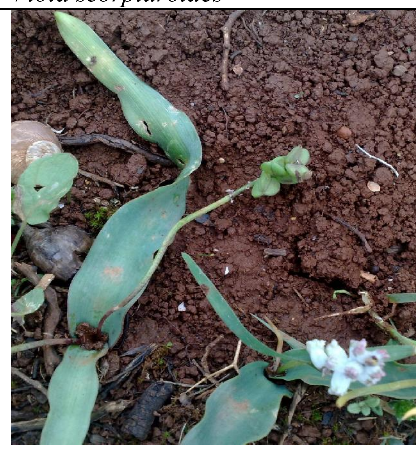


Micromeria nervosa

Teucrium apollinis

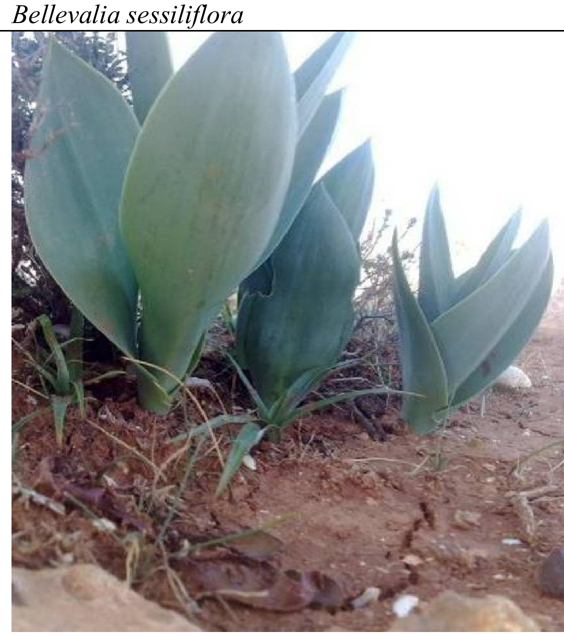
Viola scorpiuroides

Thymus capitatus



Bellevalia sessiliflora

Sarcopoterium spinosum



Drimia maritime

Micromeria juliana

Asphodelus microcarpus

Colchium palaestinum

Lotus cytisoides

Arisarum vulgare

Galium verrucosum.

Rhamnus lycioides *Daphne jasminea*

Fig.2. Picture community Rocky habitat Al-Mansora.

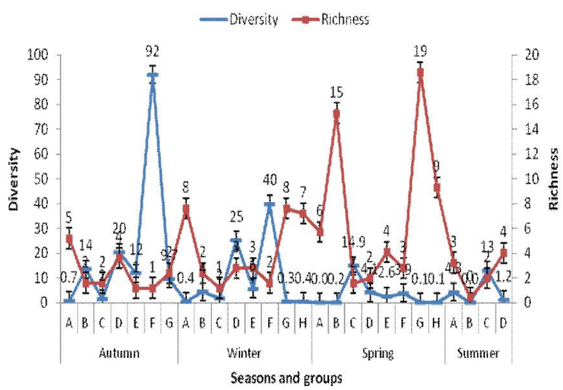


Fig. 3. Species richness, Diversity index and Standard error SE the different groups of Rocky habitat Al Mansora area.

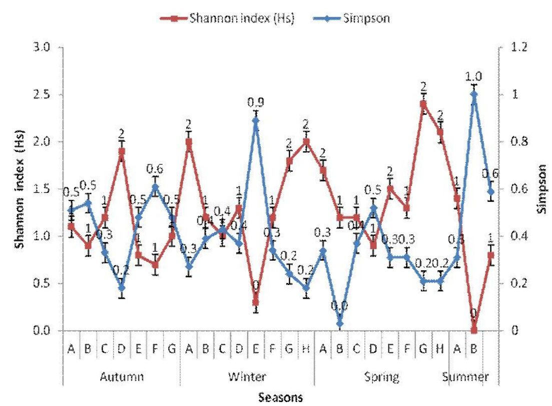


Fig.4. Shannon index (Hs), Simpson and Standard error SE the different groups of Rocky habitat Al Mansora area.

Table 1. Species richness, Diversity index, Simpson and Standard deviation SD the different groups of Rocky habitat in Al Mansora area.

Seasons	Groups	Richness	Diversity	Simpson	Shannon
Autumn	A	5.2	0.73	0.51	1.1
	B	1.6	13.5	0.54	0.9
	C	1.6	1.47	0.33	1.2
	D	3.6	20.3	0.18	1.9
	E	1.2	11.8	0.48	0.8
	F	1.2	92.1	0.61	0.7
	G	2.4	9.66	0.48	1.0
	SD	1.5	31.9	0.15	0.4
Winter	A	7.6	0.38	0.27	2.0
	B	2.4	4.37	0.39	1.2
	C	1.2	1.9	0.43	1.0
	D	2.8	25.1	0.37	1.3
	E	2.8	5.63	0.89	0.3
	F	1.6	39.9	0.34	1.2
	G	7.6	0.34	0.24	1.8
	H	7.2	0.40	0.18	2.0

	SD	2.8	14.7	0.20	0.6
Spring	A	5.7	0.008	0.34	1.7
	B	15.3	0.15	0.03	1.2
	C	1.6	14.9	0.37	1.2
	D	2.0	4.1	0.52	0.9
	E	4.1	2.6	0.31	1.5
	F	2.8	3.9	0.31	1.3
	G	18.6	0.09	0.21	2.4
	H	9.3	0.05	0.21	2.1
	SD	6.43	5.04	0.14	0.5
Summer	A	3.23	4.31	0.31	1.4
	B	0.4	-	1	0
	C	2.0	12.9	0.59	0.8
	D	4.0	1.19	0.74	0.6
	SD	1.6	5.8	0.29	0.6

Table 2. Family, Scientific name and presence * / absence in relation to each season in year 2010/2011 in Rocky habitat of Al Mansora area.

No.	Family	Scientific name	Au.	Wi.	Sp.	Su.
1	Amaryllidaceae	*Allium*[1] *negrianum* Maire & Weiller		*	*	*
2		*Allium nigrum* L.				*
3		*Narcissus elegans (*Haw). Spach.	*			
4	Anacardiaceae	*Pistacia lentiscus* L.	*	*	*	*
5	Apiaceae	*Ammi majus* L.			*	
6		*Ammi visnaga* (L.) Lam			*	
7		*Malabaila suaveolens* (Dcl.) Coss		*	*	
8		*Scandix australis* L.	*	*	*	
9		*Thapsia garganica* Lag.	*	*	*	
10		*Tordylium apulum* L.		*		
11		*Torilis arvensis (Huds.)* Link.			*	
12		*Torilis leptophylla* (L.) Reichb.			*	
13		*Torilis nodosa* (L.) Gaertn.			*	*
14	Araceae	*Arisarum vulgare* Targ. Tozz	*	*		
15	Asparagaceae[2]	*Bellevalia sessiliflora* (Viv.) Kunth	*	*		
16		*Dipcadi serotinum* (L.) Medic.			*	
17		*Drimia*[3] *maritima* (L.) Stearn	*	*	*	
18	Asteraceae	*Anthemis secundiramea* Biv.			*	
19		*Bellis sylvestris var.cyrenaica* Beguinot	*	*		
20		*Calendula arvensis* L.		*		
21		*Carlina lanata* L.			*	
22		*Carthamus lanatus* L.			*	*
23		*Centaurea alexandrina* Delile			*	
24		*Chrysanthemum segetum* L.			*	
25		*Cicerbita haimanniana* (Ascherson) Beauverd			*	
26		*Cichorium endivia*[4] L .			*	
27		*Cichorium spinosum* L.			*	
28		*Crepis senecioides ssp.senecioides* Delile			*	
29		*Dittrichia viscosa* (L.) W. Greuter			*	
30		*Filago contracta* Boiss.		*		
31		*Hedypnois cretica* (L.) Dum. – Courset			*	
32		*Helichrysum stoechas* (L.) Moench			*	
33		*Hyoseries scabra* L.		*	*	
34		*Jasonia rupestris* Pomel			*	
35		*Leontedon tuberosus* L.	*	*	*	

36		*Matricaria* [5]*aurea* (Loefl.) Sch. Bip.		*		
37		*Onopordum cyrenaicum* Maire & Weiller	*	*	*	
38		*Onopordum espinae* Cosson ex Bonnet		*		
39		*Pallenis spinosa* (L.) Cass.			*	
40		*Phagnlon rupestre* (L.) Dc.	*	*	*	
41		*Rhagadiolus stellatus* (L.) Gaertner			*	
42		*Scolymus hispanicus* L.			*	
43		*Senecio leucanthemifolius* Poiret	*	*		
44		*Tragopogon* L.			*	
45	Boraginaceae	*Borago officinalis* L.		*	*	
46		*Cynoglossum cheirifolium* L.		*	*	
47		*Echium angustifolium* Mill.			*	
48		*Echium sabulicola* Pomel			*	
49	Brassicaceae	*Alyssum minus* (L.) Rothm.		*	*	
50		*Biscutella didyma* L.		*	*	
51		*Enarthrocarpus pterocarpus* (pers.) Dc.		*		
52		*Rapistrum rugosum* (L.) All.			*	
53		*Sinapis alba* L.		*	*	
54		*Sinapis pubescens* L.			*	
55	Caryophyllaceae	*Herniaria glabra* Linn.		*	*	
56		*Paronychia argentea* Lamk.		*	*	
57		*Petrorhagia cyrenaica* (Durand & Barratte) Ball & Heywood		*	*	*
58		*Petrorhagia velutina* (Guss.) Ball & Heywood			*	
59		*Polycarpon tetraphyllum* (L.) L.			*	
60		*Silene apetala* Willd.		*	*	
61		*Silene colorata* Poiret			*	
62		*Silene cyrenaica* Maire & Weiller		*	*	
63	Cistaceae	*Cistus parviflorus* Lam.	*	*	*	*
64		*Fumana laevipes* (L.) Spach	*	*	*	*
65		*Fumana thymifolia* (L.) Spach			*	
66	Colchicaceae[6]	*Colchium* [7]*palaestinum*	*	*		
67	Convolvulaceae	*Convolvulus althaeoides* L.			*	
68		*Cuscuta*[8] *epithymum* L.			*	*
69	Crassulaceae	*Sedum sediforme* (Jacq.) Pau	*	*	*	
70		*Umbilicus horizontalis*	*	*	*	
71	Cupressaceae	*Juniperus phoenicea* L.	*	*	*	*
72	Dipsacaceae	*Scabiosa arenaria* Forskal			*	
73	Ericaceae	*Erica multiflora* L.	*	*	*	*
74	Euphorbiaceae	*Euphorbia falcata* L.			*	
75		*Euphorbia parvula* Del.			*	
76		*Mercurialis annua* L.		*	*	
77	Fabaceae	*Anthyllis tetraphylla* L.			*	
78		*Anthyllis vulneraria* L.			*	
79		*Bituminaria*[9] *bituminosa* (L.) C.H. Stirt.			*	
80		*Calicotome villosa* (Poir.) Link	*	*		
81		*Ceratonia* [10]*siliqua* L.			*	
82		*Hippocrepis cyclocarpa* Murb.		*	*	
83		*Lotus cytisoides* L.	*	*	*	
84		*Lotus ornithopodioides* L.			*	
85		*Lotus*[11] *tetragonolobus*[11] L.			*	
86		*Medicago coronata* (L.) Bart			*	
87		*Medicago minima* (L.) Bart.			*	
88		*Medicago orbicularis* (L.) Bart.			*	

89		*Medicago polymorpha* L.		*	*	
90		*Medicago truncatula* Gaertn.			*	
91		*Melilotus indicus* (L.) All.			*	
92		*Ononis reclinata* L.			*	
93		*Ononis vaginalis* Vahl.			*	
94		*Scorpiurus muricatus* L.			*	
95		*Trifolium campestre* Schreb.			*	
96		*Trifolium scabrum* L.			*	
97		*Trifolium uniflorum* L.		*		
98	Gentianaceae	*Centaurium pulchellum* (Swartz) Druce			*	
99	Geraniaceae	*Erodium malacoides* (L.) L'Herit.	*	*	*	
100		*Erodium moschatum* (L.) L'Herit.		*		
101		*Erodium touchyanum* Delile		*		
102		*Geranium molle* L.		*		
103	Hypericaceae [(12)]	*Hypericum triquetrifolium* Turra			*	
104	Iridaceae	*Moraea* [(13)]*sisyrinchium* (L.)Ker Gaweler			*	
105		*Rumelea cyrenaica* Beguinot	*	*		
106	Lamiaceae	*Ballota pseudo-dictamnus* (L.) Benth.			*	
107		*Marrubium vulgare* L.			*	
108		*Micromeria Juliana* (L.) Benth. Ex Reichenb.	*	*	*	*
109		*Micromeria nervosa* (Desf.) Benth.	*	*	*	
110		*Origanum cyrenaicum* Beg. et Vaccari			*	
111		*Phlomis floccosa* D. Don	*	*	*	*
112		*Prasium majus* L.	*	*	*	
113		*Satureja thymbra* L.		*	*	*
114		*Siderites curvidens* Stapf.			*	
115		*Teucrium apollinis* Maire et Weiller	*	*	*	
116		*Teucrium brevifolium* Schreber			*	
117		*Thymus capitatus* (L.) Hoffm .& Link	*	*	*	*
118	Liliaceae	*Gagea reticulata* (Pall.) Schult.		*		
119	Linaceae	*Linum usitatissimum* L.	*	*		
120	Malvaceae	*Malva parviflora* L.			*	
121	Myrsinaceae [(14)]	*Anagallis arvensis* L.	*	*	*	
122		*Cyclamen rohlfsianum* Aschers.	*	*		
123	Oleaceae	*Olea europaea var. oleaster* (Hoffmg.&Link) Dc.			*	
124		*Phillyrea latifolia* L.	*	*	*	*
125	Orchidaceae	*Anacamptis*[(15)] *collina* (Banks & Sol. ex Russell) R.M. Bateman, Pridgeon & M.W.Chase		*		
126	Papaveraceae	*Glaucium flavum* Crantz			*	
127		*Papaver rhoeas var. rhoeas*				*
128	Plantaginaceae	*Globularia.*[(16)] *alypum* L	*	*	*	*
129		*Linaria*[(17)] *triphylla* (L.) Mill.		*	*	
130		*Linaria virgata* (poir) Desf.		*		
131		*Misopates*[(17)] *orontium* (L.) Rafin.			*	
132		*Plantago coronopus* L.		*	*	
133		*Plantago lagopus* L.			*	
134	Poaceae	*Avena barbata* Pott ex Link			*	
135		*Briza maxima* L.			*	
136		*Bromus alopecuros* Poir.			*	
137		*Bromus madritensis* L.				*
138		*Bromus rigidus* Roth			*	
139		*Catapodium rigidum* (L.) C.E. Hubbard			*	
140		*Crithopsis delileana* (Schultes) Rozhev.			*	
141		*Cynosurus elegans* Desf.			*	

142		*Dactylis glomerata* L.			*	
143		*Gastridium ventricosum* (Gouan) schinz et Thell.			*	
144		*Hyparrhenia hirta* (L.) Stapf			*	
145		*Lolium loliaceum* (Bory et Chaub.) Hand.-Mazz.			*	
146		*Lolium rigidum* Guad.			*	
147		*Melica minuta* L.			*	
148		*Oryzopsis*(18) *miliacea*(18) (L.) Asch. & Schweinf.			*	
149		*Parapholis incurva* (L.) C.E. Hubbard			*	
150		*Paspalidium geminatum* (Forsk.) Stapf			*	
151		*Phalaris minor* Retz.			*	
152		*Poa bulbosa* L.		*	*	
153		*Stipa capensis* Thunb.			*	
154		*Trachynia distachya* (L.) Link.			*	
155		*Trisetaria macrochaeta* (Boiss.) Maire			*	
156	Polygonaceae	*Polygonum equisetiforme* sm.			*	
157	Ranunculaceae	*Adonis microcarpa* DC.		*	*	
158		*Nigella damascena* L.		*	*	
159		*Ranunculus asiaticus* L.	*	*		
160		*Ranunculus bullatus* L.		*		
161	Rhamnaceae	*Rhamnus lycioides* L. Jahandez	*	*	*	*
162	Rosaceae	*Sarcopoterium spinosum* (L.) Spach	*	*	*	*
163	Rubiaceae	*Galium verrucosum* Huds.	*	*	*	
164		*Phuopsis*(19) *stylosa*(19) Trin.	*	*	*	*
165		*Sherardia arvensis* L.			*	
166		*Theligonum*(20) *cynocrambe* L.		*	*	
167		*Valantia lanata* Del. Ex Coss.			*	
168	Scrophulariaceae	*Scrophularia canina* L.		*	*	*
169	Solanaceae	*Datura innoxia* Mill.			*	
170		*Nicotiana glauca* R.C.Graham			*	
171	Thymelaeceae	*Daphne jasminea* Sibth. Et Sm.	*	*	*	*
172	Valerianaceae	*Centranthus calcitrapae* (L.) Dufresne		*	*	
173		*Fedia cornucopiae* (L.) Gaetner		*	*	
174	Violaceae	*Viola scorpiuroides* Coss.	*	*	*	
175	Xanthorrhoaeceae	*Asphodelus*(21) *microcarpus* Salzm.& Viv.	*	*	*	
Total			42	82	147	24

(1) Genus Allium was followed family Alliaceae but recently Amaryllidaceae family. (Chase *et al.,* 2009).
(2) Genus Bellevalia,Dipcadi and Drimia was followed family Liliaceae but became follows Asparagaceae family. (Chase *et al.,* 2009).
(3) Synonyms name to genus *Drimia maritima* (L.) Stearn was called *Urginea maritima* (L.) Baker. (Wikipedia, 2012).
(4) Synonyms name to species *Cichorium pumilum* Jacq, was called *Cichorium endivia* L. (Boulos, 2002).
(5) Genus Matricaria aurea (Loefl.) Sch. Bip synonyms name *Chamomilla aurea* (Loefl.) Gay ex Cosson & Kralik (Boulos, 2002).
(6) Family Colchicaceae derived from family Liliaceae (Boulos,2005).
(7) Synonyms name to genus Colchium was Androcymbium (Vinnersten and Manning, 2007; Manning and Vinnersten, 2007). Also, species *Androcymbium palaestinum* Baker. (Boulos, 2002) was called *Androcymbium gramineum* (Cav.) Mc Bride (Jafri and El-Gadi, 1977).
(8) Genus Cuscuta was from a family Cuscutaceae but joined the family Convolvulaceae. (United States Department of Agriculture, 2009).
(9) Genus Bituminaria bituminosa (L.) C.H. Stirt. was followed to genus Psoralea bituminosa L. (Boulos, 1999).
(10) Genus Ceratonia siliqua L. It was Caesalpinaceae family recently it has become Fabaceae family. (Martin *et al.,* 2006).
(11) Genus and species to Lotus tetragonolobus L. was called Tetragonolobus purpureus Moench. (Boulos, 1999).
(12) Hypericaceae was called Guttiferae (Wikipedia, 2012).
(13) Genus *Moraea sisyrinchium* (L.)Ker Gaweler was called *Iris sisyrinchium* L (Boulos, 2005).
(14) Anagallis,Cyclamen derive from Primulaceae family and enter the newly to Myrsinaceae family (Wikipedia, 2012).
(15) Recently genus *Anacamptis collina* (Banks & Sol. ex Russell) R.M. Bateman, Pridgeon & M.W.Chase was called *Orchis collina* Soland (Wikipedia, 2012).
(16) Genus *Globularia alypum* L. It was Globulariaceae family but now joined the family Plantaginaceae (Wikipedia, 2012).
(17) Genus Linaria and Misopates was from Scrophulariaceae family but now become belongs to Plantaginaceae family. (Wikipedia, 2012).
(18) Genus and species Oryzopsis miliacea (L.) Asch. & Schweinf. Recently it has become *Piptatherum miliaceum* (L.) Coss. (Boulos, 2005).
(19) Genus and species Phuopsis stylosa Trin change to Putoria calabrica (L.f.) DC. (Wikipedia, 2012).
(20) Theligonum cynocrambe L. It was Theligonaceae family but joined the family Rubiaceae. (The World Checklist. 2012).
(21) Genus Asphodelus. Was followed liliaceae family (Jafri and El-Gadi, 1977), and was followed Asphodelaceae (Boulos, 2005), and recently it has become Xanthorrhoaeceae family. (Chase *et al.,* 2009).

Soil-vegetation Relationship

The different soil characteristics in the community representing the different vegetation are recorded in Tables 3-5. The mechanical analysis of the soil samples for the vegetation community showed habitat site variations in Rocky habitat Al-Mansora.

Sand: The highest mean value of sand in community *Thymus capitatus* 37 % compared with 17 and 13 % in community *Cistus parviflorus* and *Sarcopoterium spinosum*, respectively.

Silt: Community *Thymus capitatus* has the highest silt value to 50 %, while *Cistus parviflorus* 44 %. Clay: The soil supporting community *Sarcopoterium spinosum* has the highest mean value 49 % in Rocky habitat, while community *Cistus parviflorus* has intermediate mean value of 39 % clay and lowest to 13 % in community *Thymus capitatus*.

Soil texture: Silty clay in community *Sarcopoterium spinosum* and *Cistus parviflorus*, whiles silty loam to community *Thymus capitatus*. pH value: Generally neutral with a narrow range of variations in all community. Electrical conductivity (EC): As clear from table (3), that community *Thymus capitatus* have the highest mean value of 1.7 mmohs/cm, while the lowest mean value were recorded in community *Cistus parviflorus* and *Sarcopoterium spinosum* reached 0.52 and 0.61 mmohs/cm, respectively. Nitrogen (N): The value of nitrogen content in the soil extract ranged between 0.16 to 0.12 %. Moisture contact (MC %): Moisture contact in soil their reactions with a narrow range of variations that reached 4.88 to 4.43 % in Rocky habitat Al-Mansora. Chloride sodium ($NaCl^-$ %): The soluble chloride sodium was the highest to 1.8 % in community *Thymus capitatus*, while low to 0.2 and 0.4 in *Sarcopoterium spinosum* and *Cistus parviflorus*, respectively. Chloride content (Cl^- mg/l): The souluble chloride content is one of the main soluble anions, attaining the highest mean value in community *Thymus capitatus* to 360 mg/l. Carbonate content ($Co3^-$mg/l): The noncarbonate content in the samples which were collected from the different localities. Sulphate content (So^{--4}mg/l): From table 3, the value of sulphates was the highest in community *Sarcopoterium spinosum* 22.63 mg/l, while the minimum mean value of 12.5 mg/l is found in community *Thymus capitatus*. Sodium contant (Na^+): The value of sodium content in the soil 90 mg/l in community *Thymus capitatus*. Potassium content (K^+): The results of soil analysis indicate that potassium content has highest value in community *Thymus capitatus* to 30 mg/l, while the lowest value was in *Sarcopoterium spinosum* and *Cistus parviflorus* 6 and 4 mg/l, respectively. Calcium content (Ca^{++}): Calcium content is 7.4 in community *Thymus capitatus* and lowest to 2.72 and 3.08 in community *Sarcopoterium spinosum* and *Cistus parviflorus*, respectively. Magnesium content (Mg^{++}): The highest value of Magnesium was in community *Thymus capitatus* and *Cistus parviflorus* 1.8 and lowest to 0.88 in *Sarcopoterium spinosum*.

Table 3. Physical and chemical analysis of soil samples for Al Mansora area. Community *Thymus capitatus*, *Sarcopoterium spinosum* and *Cistus parviflorus* are vegetation groups resulting from TWINSPAN.

Soil variable		**Classification community**		
Community		*Thymus capitatus*	*Sarcopoterium spinosum*	*Cistus parviflorus*
Soil fraction	Sand	0.37	0.13	0.17
	Silt	0.50	0.38	0.44
	Clay	0.13	0.49	0.39
Soil texture		Silty loam	Silty clay	Silty clay loam
pH		6.83	7.33	6.14
EC (mmohs/cm)		1.7	0.61	0.52
N %		0.16	0.14	0.12
MC %		4.43	4.88	4.43
$NaCl^-$ %		1.8	0.2	0.4
Anions (mg/L)	Cl^-	360	280	288
	$Co3^-$	0	0	0
	$So4^{--}$	12.5	22.63	20.63
Cations (m.eq./l)	Na^+	3.91	0.26	3.04
	K^+	0.77	0.15	0.10
	Ca^{++}	7.40	2.72	3.08
	Mg^{++}	1.80	0.88	1.84

Soil texture in community *Thymus capitatus* was silty lome while soil texture in community *Sarcopoterium spinosum* and *Cistus parviflorus* was silty clay, increased electrical conductivity, cations and anions in the community *Thymus capitatus* compared *Sarcopoterium spinosum* and *Cistus parviflorus* except magnesium in *Cistus parviflorus* arrived to 1.84 m.eq./L.and was pH in the Rocky habitat of Mansoura close to neutral. Arrived electrical conductivity in *Thymus capitatus* to 1.7 mmohs/cm evidence of *Thymus capitatus* grow in soil salinity.

Generally, found an inverse relationship between the different soil characteristics and species richness and simpson index and positive relationship between diversity index and Shannon, except clay, So4, Na and Mg. while silt noncorrelation. No significant between all soil and diversity characteristics. Found negative strong correlation between pH and N and species richness and Simpson index and positive relationship between diversity index and Shannon.

Table. 4. Correlation between soil properties and characteristics of diversity in autumn season of Rocky habitat Al mansora area.

	Species richness	Diversity index	Simpson index	Shannon index
Sand %	-0.359	0.359	-0.359	0.359
Silt %	0	0	0	0
Clay %	0.294	-0.294	0.294	-0.294
pH	-0.908	0.908	-0.908	0.908
EC	-0.558	0.558	-0.558	0.558
N %	-0.866	0.866	-0.866	0.866
MC %	-0.500	0.500	-0.500	0.500
$NaCl^-$ %	-0.397	0.397	-0.397	0.397
Cl^-	-0.419	0.419	-0.419	0.419
So4⁻⁻	0.330	-0.330	0.330	-0.330
Na^+	0.289	-0.289	0.289	-0.289
K^+	-0.557	0.557	-0.557	0.557
Ca^{++}	-0.439	0.439	-0.439	0.439
Mg^{++}	0.532	-0.532	0.532	-0.532

*Correlation is significant at 0.05 level (2-tailed)

Table 5. Pearson-moment correlation (r) between the different soile variables of Rocky habitat in Al-Mansora area.

Sand	1.00													
Silt	0.93	1.00												
Clay	-0.99	-0.97*	1.00											
pH	-0.06*	0.42	0.18	1.00										
EC	0.97	0.83	-0.94*	0.16	1.00									
N	0.78	0.5	-0.70	0.58	0.90	1.00								
MC	-0.63	-0.87	0.71	0.82	-0.44	0.00	1.00							
NaCl	1.00	0.92	-0.99*	-0.02*	0.98	0.80	-0.60	1.00*						
Cl	1.00	0.91	-0.98	0.00	0.99*	0.82	-0.58	1.00	1.00					
So4	-1.00	-0.94*	1.00	0.09*	-0.97*	-0.76	0.65	-1.00*	-1.00	1.00				
Na	0.98	0.98	-1.00	-0.24	0.92	0.65	-0.76	0.98	0.97	-0.99	1.00			
K	0.97	0.83	-0.94*	0.16	1.00	0.90	-0.44	0.98	0.99	-0.97*	0.92	1.00		
Ca	1.00	0.90	-0.98	0.02*	0.99	0.83	-0.56*	1.00	1.00*	-0.99*	0.97	0.99*	1.00	
Mg	0.60	0.85	-0.69	-0.84	0.41	-0.04	-1.00	0.57	0.55*	-0.62	0.73	0.41	0.53	1.00
	Sand	**Clay**	**Silt**	**pH**	**EC**	**N**	**MC**	**NaCl**	**Cl**	**So**	**Na**	**K**	**Ca**	**Mg**

*Correlation is significant at 0.05 level (2-tailed)

In Mansoura Rocky habitat there is a strong correlation between the sand with reverse clay and sulfates and direction between the sand with the rest of the properties, either clay strong correlation was positive with all the studied characteristics except humidity and sulfates either clay and silt with pH is a weak positive correlation. And associated silt negative correlation with all studied soil properties except sulfates. pH has been associated with all the weak correlation characteristics except the humidity, the more increased pH. While electrical conductivity associated with a strong positive correlation with all properties except with moisture and sulfates and weak with magnesium. And there was no correlation between the percentage of nitrogen and moisture and is very weak and negative with a strong magnesium and potassium, calcium, chloride, sodium and chlorine. Humidity showed an inverse relationship with all the studied characteristics except sulfates. The sodium chloride and chlorine associated with a strong correlation with all characteristics except sulfates. The results showed negative correlation between the properties and sulfates and positive with sodium, potassium and calcium.

The correlation coefficient (r) between the different soil variables in the sampled is shown in Table 5 show high significance with other edaphic variables.

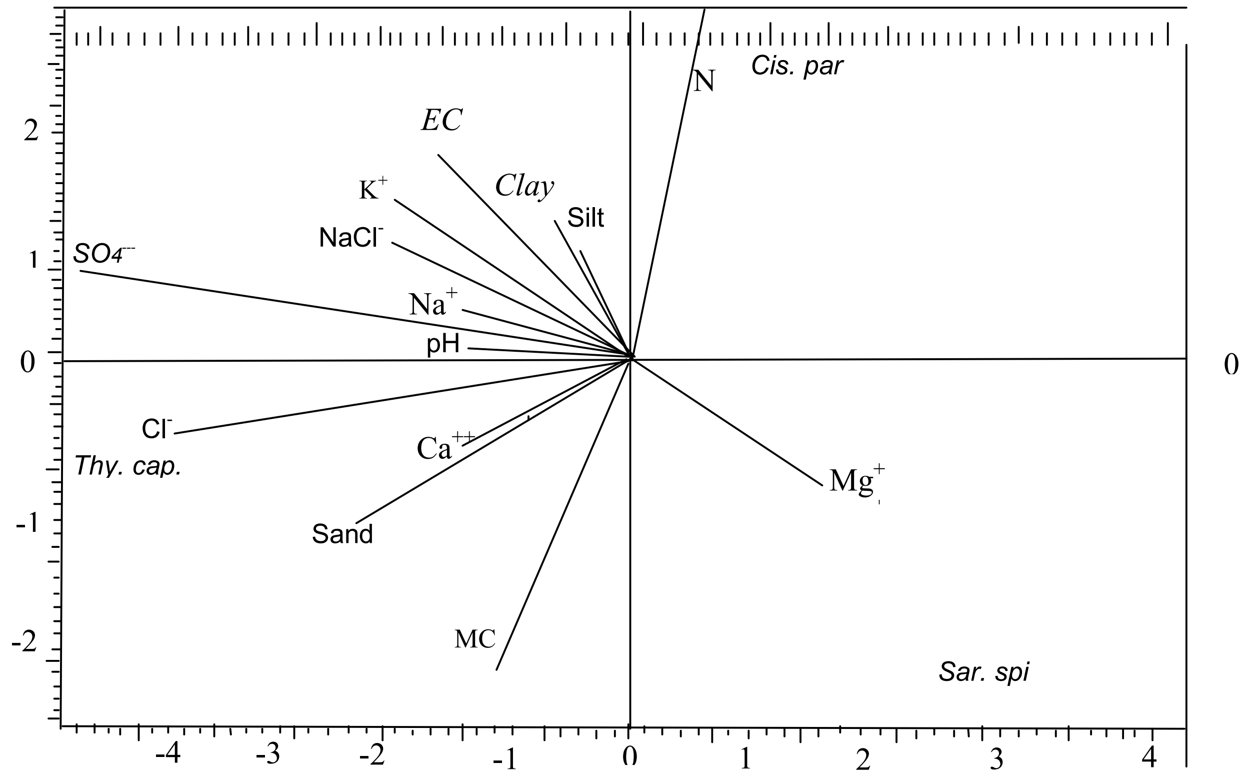


Fig. 5. PCA (principal components analysis) correlation ordination diagram of importance value to stands with vegetation groups from TWINSPAN classification of the vegetation in Rocky habitat Al-Mansora.

Jarjr-Oma habitats

Table 3 and figures 5-7 demonstrates the differences in species richness**,** Diversity index, Simpson and Shannon index, where the lowest value of species richness is recorded in summer season, while the highest value of 18.9 D and 18.2 C, Saline and Rocky coastal habitats, respectively during spring season. Also, increased of diversity index in autumn, winter and summer season, while, decrease in spring season reaching to 0.01 in group A Saline habitat. Note that the greater the diversity index the less diversity.

Simpson's reciprocal index the higher the value in autumn, the maximum value is 1.0. Shannon index (H') lower values appeared in summer and autumn seasons compared to the rest of the seasons.

Highest species richness in Rocky costal habitat followed Saline habitat, but low species richness Sand formation, Sandy beach and Salt march habitats, respectively in all seasons especially summer and autumn season. Increased species richness and Shannon index (H') during spring and winter.

The applied classification technique here was the Two-Way Indicator Species Analysis (TWINSPAN), divided the vegetation in Jarjr oma habitats in autumn season into groups depending on the average number of species in habitats and group: Salt march habitat Group A this vegetation type *Suaeda vera* Group B this vegetation type comprises *Limoniastrum monopetalum* which attained the highest density followed *Arisarum vulgare*. Whileas, Saline habitat Group A species *Onopordum cyrenaicum* association *Polycarpon tetraphyllum*. Groups B Comprises *Mercurialis annua*. association *Rumex bucephalophorus*. Group C Vegetation of this community the dominant species *Arisarum vulgare*. Group D Dominant by *Anagallis arvensis* associated *Bellevalia sessiliflora*. However, Rocky habitat Group A *Rumex bucephalophorus*. Group B *Centaurea alexandrina* species. Group C *Calendula arvensis* associated *Torilis nodosa*. Group D *Arisarum vulgare* associated *Mercurialis annua* and *Anagallis arvensis*. Sandy beach habitat Group A *Tamarix tetragyna* and Group B *Cynodon dactylon* associated *Cichorium spinosum*. In Sand formation habitat dominant by *Retama raetem* associated *Crucianella maritima*.

a. *Suaeda vera*

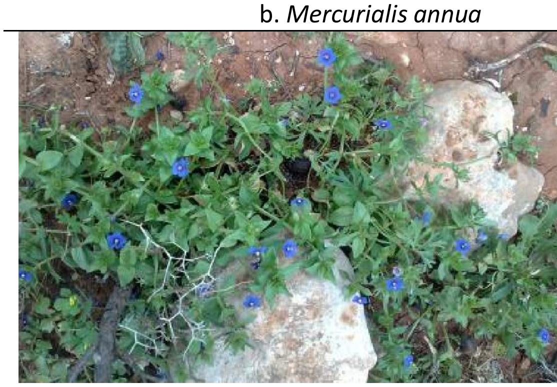
a. *Limoniastrum monopetalum*

b. *Onopordum cyrenaicum*

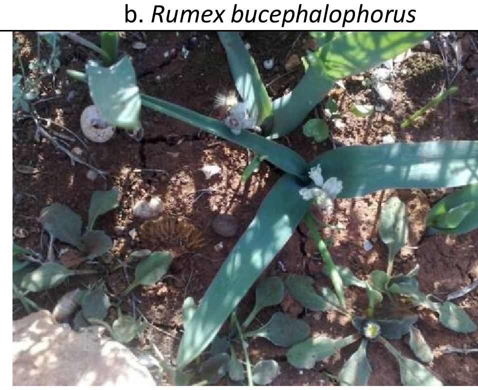
b. *Polycarpon tetraphyllum*

b. *Mercurialis annua*

b. *Rumex bucephalophorus*

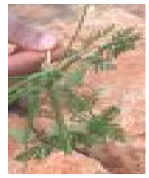


b. *Anagallis arvensis*



b. *Bellevalia sessiliflora*

. *Centaurea alexandrina*



c. *Torilis nodosa*

d. *Juncus acutus*

d. *Cynodon dactylon*

d. *Cichorium spinosum*

d. *Zygophyllum album*

e. *Retama raetem*

e. *Nitraria retusa*

a. **Salt march**

b. **Saline**

c. Rocky

d. Sandy beach

e. Sand formation

Fig. 6. Picture community a. Salt march, b. Saline, c. Rocky, d. Sandy beach and e. Sand formation habitat of Jarjr-oma area.

Table 6. Species richness, Diversity index, Simpson, Shannon index (H') and Standard deviation SD the different groups of five habitats in Jarjr oma area.

Seasons	Habitats	Groups	Richness	Diversity	Simpson	Shannon
Autumn	**Salt march**	A	0.4	0	1	0
		B	1.6	0.63	0.23	0.88
	Saline	A	3.2	64	0.42	1.06
		B	1.2	417.3	0.57	0.76
		C	0.8	550.2	0.93	0.16
		D	5.3	21.8	0.34	1.43
	Rocky coastal	A	2.0	1.3	1	0
		B	0.4	0	1	0
		C	3.6	1.1	0.16	1.98
		D	9.7	5.5	0.19	1.96
	Sandy Beach	A	0.4	0	1	0
		B	3.6	0.9	0.21	1.8
	Sand formation	A	1.2	2.3	0.14	1.08
Winter	**Salt march**	A	0.4	0	1	0
		B	3.6	6.2	0.24	1.70
	Saline	A	17.36	0.01	0.07	3.22
		B	0.81	143.7	0.51	0.68
		C	1.61	63.8	0.58	0.83
		D	9.29	1.72	0.13	2.36
	Rocky coastal	A	3.63	0.058	0.37	1.46
		B	0.40	0	1	0
		C	2.02	14.5	0.23	1.53
		D	35.5	0.14	0.07	3.22
	Sandy Beach	A	0.81	538.8	0.98	0.06
		B	5.65	0.97	0.24	1.92
	Sand formation	A	2.8	8.5	0.23	1.68
Spring	**Salt march**	A	1.61	26.2	0.49	0.92
		B	2.42	7.96	0.75	0.61
	Saline	A	6.06	23.91	0.35	1.55
		B	0.81	54.89	0.89	0.22
		C	0.4	0	1	0
		D	18.97	0.07	0.09	3.03
	Rocky coastal	A	0.40	0	1	0
		B	4.44	2.59	0.47	1.20
		C	18.17	0.05	0.0002	0.06
		D	17.36	0.15	0.101	2.77
	Sandy Beach	A	0.81	82.1	0.95	0.11
		B	7.27	0.333	0.15	2.28
	Sand formation	A	2.83	11	0.24	1.64
Summer	**Salt march**	A	1.61	55.73	0.36	1.09
	Saline	A	1.21	15.7	0.63	0.62
		B	2.83	0.095	0.24	1.65
	Rocky coastal	A	2.42	0.039	0.21	1.65
		B	1.61	0.79	0.65	0.68
		C	2.42	0.17	0.24	1.56
	Sandy Beach	A	2.42	205.8	0.75	0.57
		B	3.63	0.46	0.17	1.96
	Sand formation	A	1.61	1.33	0.26	1.37

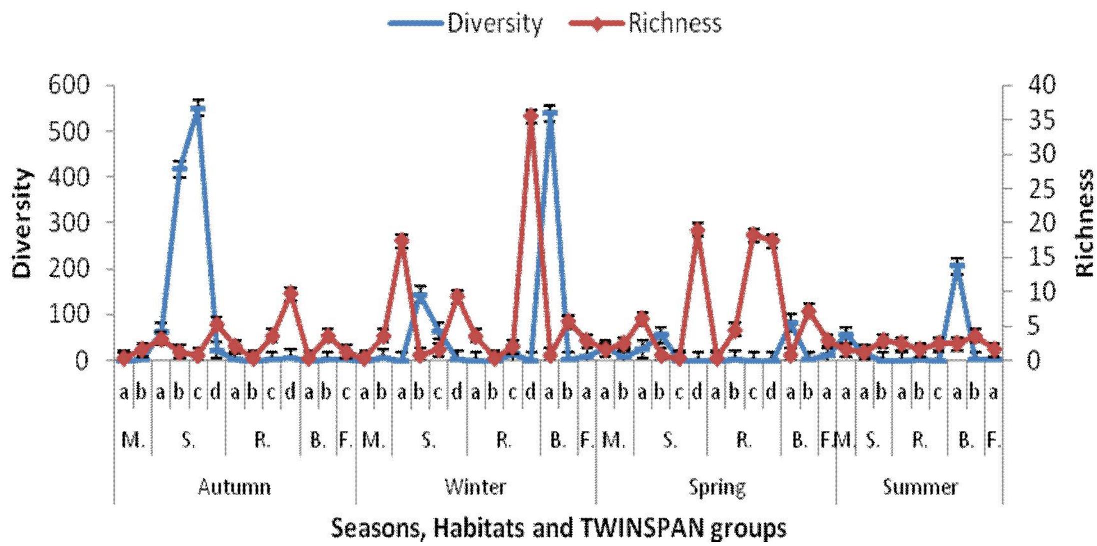


Fig. 7. Species richness, Diversity index and Standard error SE the different TWINSPAN groups of five habitat of Jarjr oma area.

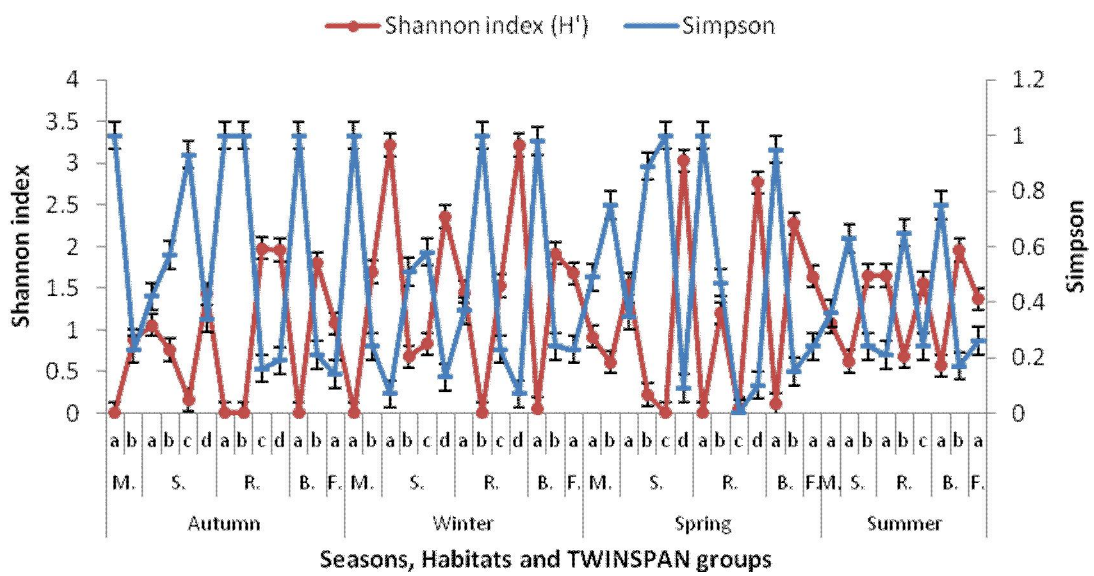


Fig. 8. Shannon index (Hs), Simpson and Standard error SE the different TWINSPAN groups of five habitat of Jarjr oma area.

Soil-vegetation Relationship

The different soil characteristics in the community representing the different vegetation in different habitats are recorded in Tables 7-11.

The mechanical analysis of the soil samples for the vegetation community showed habitat site variations in Rocky coastal, Salt march, Saline, Sandy beach and Sand formation in site Jarjr oma.

Rocky coastal: Sand: The highest mean value of sand in community *Rhus tripartita* compared with *Sarcopoterium spinosum* and *Suaeda vera* 17% and 15%, respectively. Silt: Community *Suaeda vera* has the highest silt value to 41% while *Sarcopoterium spinosum* and *Rhus tripartita* 39% and 37% respectively. Clay: Convergent community to clay perecentage of *Suaeda vera* and *Sarcopoterium spinosum* both 44%, while *Rhus tripartita* 42%.
Soil texture: Silty clay in *Suaeda vera* community, clay loam in *Rhus tripartita* community, while, silty clay loam in *Sarcopoterium spinosum*. pH value: A natural generally 7.69 in *Sarcopoterium spinosum* community and 7.3 in *Rhus tripartita* community and

Suaeda vera community. Electrical conductivity (EC): Community *Suaeda vera* have highest mean value of 2.42 mmohs/cm, while the lowest value were recorded in community *Rhus tripartita* and *Sarcopoterium spinosum* reached 1.36 and 0.66 mmohs/cm respectively. Nitrogen: The value of nitrogen content in the soil extract ranged between 0.13 to 0.15%. Moisture contact (MC%): The proportion of moisture contact in soil reached to 3.05% in *Rhus tripartita* community and 3.31% in *Suaeda vera* community, while the highest were ratio *Sarcopoterium spinosum* 4.39%.

Table 7. Physical and chemical analysis of soil samples for five habitats in Jarjr-oma area. Community based on vegetation groups resulting from TWINSPAN.

Soil variable		Classification community							
Habitat		S. B	S. F	S. M	Sa.		R		
Community		*Cyn. dac.*	*Ret. rae.*	*Sua. ver.*	*Sar. spi*	*Jun. acu.*	*Sar. spi.*	*Sua. ver.*	*Rhu. tri.*
Soil fraction	Sand	0.53	0.81	0.37	0.79	0.19	0.17	0.15	0.21
	Silt	0.11	0.03	0.07	0.05	0.11	0.39	0.41	0.37
	Clay	0.36	0.16	0.56	0.16	0.70	0.44	0.44	0.42
Soil texture		Loam	Loamy sand	Silty loam	Loamy sand	Silty loam	Silty clay loam	Silty clay	Clay loam
pH		8.05	7.74	7.08	8.14	7.83	7.69	7.37	7.3
EC (mmohs/cm)		6.61	11.29	36.2	11.36	9.39	0.66	2.42	1.36
N %		0.16	0.03	0.13	0.10	0.12	0.13	0.15	0.14
MC %		1.65	0.38	0.36	0.29	3.59	4.39	3.31	3.05
$NaCl^{-}$ %		8.1	15.1	48.5	1.2	11.8	0.4	1.8	1.4
Anions (mg/L.)	Cl^{-}	290	490	390	530	450	315	310	300
	$Co3^{=}$	0	0	0	0	0	0	0	0
	$So4^{=}$	15.99	1902.15	1300	1922.15	1900	15.09	15.77	11.6
Cations (m.eq./L.)	Na^{+}	39.1	78.3	573.9	5.7	83.5	3.5	18.3	7.0
	K^{+}	1.5	2.1	2.6	0.8	1.5	0.5	1.2	0.2
	Ca^{++}	1.92	11.12	19.45	2.18	6.04	3.60	4.58	4.28
	Mg^{++}	7.60	12.28	8.98	3.46	8.76	0.80	1.06	0.32

S.B.= Sandy beach, S.F.= Sand formation, S.M.= Salt march, S.=Saline and R.=Rocky coastal.

Table 8. Correlation between soil properties and characteristics of diversity in autumn season of tow habitat in Jarjr-oma area.

	Species richness		Diversity index		Simpson index		Shannon index	
	Saline	Rocky	Saline	Rocky	Saline	Rocky	Saline	Rocky
Sand	-1*	0.189	1*	-0.189	1*	-0.189	-1*	0.189
Silt	1*	-0.500	-1*	0.500	-1*	0.500	1*	-0.500
Clay	1*	0	-1*	0	-1*	0	1*	0
pH	1*	-0.986	-1*	0.986	-1*	0.986	1*	-0.986
EC	-1*	0.801	1*	-0.801	1*	-0.801	-1*	0.801
N %	1*	0.866	-1*	-0.866	-1*	-0.866	1*	0.866
MC	1*	-0.983	-1*	0.983	-1*	0.983	1*	-0.983
$NaCl^{-}$	1*	0.961	-1*	-0.961	-1*	-0.961	1*	0.961
Cl^{-}	-1*	-0.756	1*	0.756	1*	0.756	-1*	-0.756
So^{--4}	-1*	-0.363	1*	0.363	1*	0.363	-1*	-0.363
Na^{+}	1*	0.683	-1*	-0.683	-1*	-0.683	1*	0.683
K^{+}	1*	0.225	-1*	-0.225	-1*	-0.225	1*	0.225
Ca^{++}	1*	0.954	-1*	-0.954	-1*	-0.954	1*	0.954
Mg^{++}	1*	-0.169	-1*	0.169	-1*	0.169	1*	-0.169

*Correlation is significant at 0.05 level (2-tailed)

Generaly, significant positive correlation strong with all characteristics, except sand, electrical conductivity, cloride, sulphate of species richness and shannon index in Saline, and negative in diversity index and simpson index, while, in Rocky coastal habitat were correlation strong with all characteristics of species richness and shannon index, and inverse with diversity index and simpson index, except sand, sulphate, potassium and magnesium, and incorrelation with clay. All characteristics were positive correlation, except, silt, pH, MC, Cl, So4 and Mg in species richness and Shannon index and opposite in diversity index and Simpson.

Found a significant positive correlation strong between the percentage of silt and electrical conductivity, sodium, calcium, magnesium, and species richness and diversity index in the habitat Rocky coastal in Jarjr oma, either Saline habitat and found a weak correlation nonsignificant between soil properties and characteristics of diversity in general.

Table 9. Pearson-moment correlation (r) between the different soile variables of five habitats Jarjr-oma area.

Sand	1													
Silt	-0.76	1												
Clay	-0.81	0.25	1											
pH	0.54*	-0.41	-0.44	1										
EC	0.25	-0.62	0.18	-0.36	1									
N	-0.68	0.53	0.54*	-0.21	-0.16	1								
MC	-0.85	0.80	0.56	-0.13	-0.66	0.49	1							
NaCl	0.09	-0.51	0.33	-0.51	0.96*	-0.11	-0.52*	1						
Cl	0.68	-0.73	-0.36	0.40	0.35	-0.77	-0.58	0.17	1					
SO4	0.58	-0.81	-0.14	0.29	0.50	-0.72	-0.57	0.36*	0.96*	1				
Na	-0.01	-0.39	0.37	-0.58*	0.95	0.02	-0.45	0.98	0.09	0.27	1			
K	0.31	-0.68	0.15	-0.18	0.79	-0.31	-0.57	0.84	0.31	0.48	0.75*	1*		
Ca	0.08	-0.39	0.24	-0.64	0.87	-0.30	-0.47	0.94	0.22	0.39*	0.92	0.79	1*	
Mg	0.53	-0.03*	-0.03	0.16	0.57	-0.56	-0.59	0.61	0.51	0.66	0.45	0.86	0.57	1*
	Sand	Clay	Silt	pH	EC	N	MC	NaCl	Cl	So	Na	K	Ca	Mg

*Correlation is significant at 0.05 level (2-tailed)

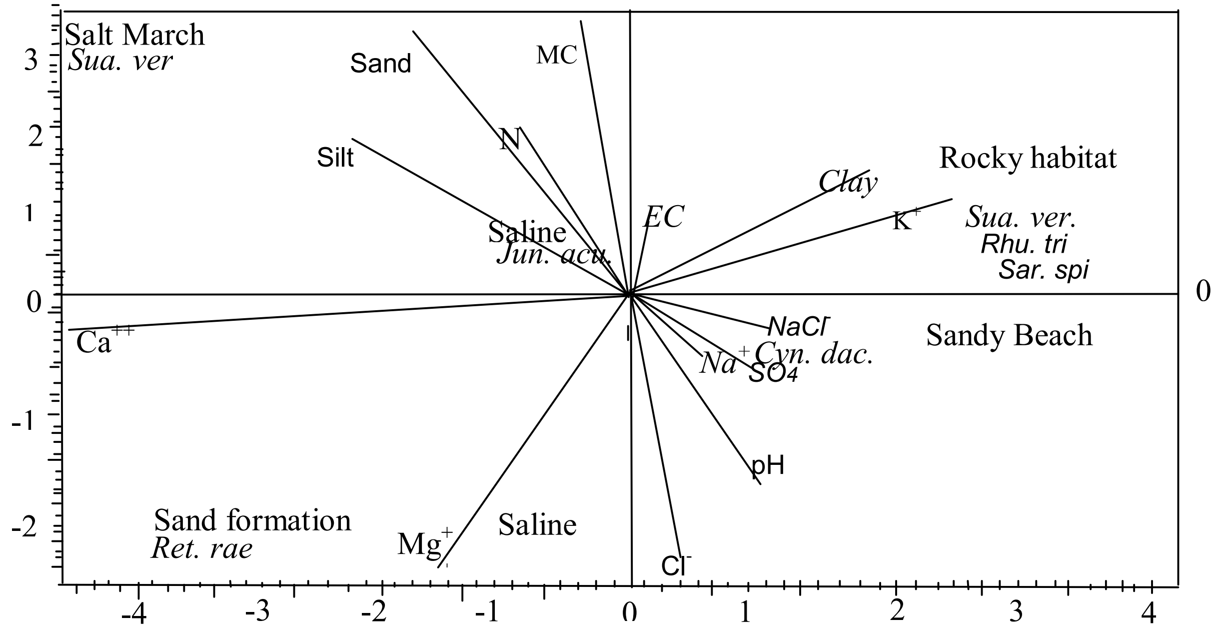


Fig. 9. PCA (principal components analysis) correlation ordination diagram with vegetation groups-soil in five habitats Jarjr-oma area.

Table 10. Pearson-moment correlation (r) between the different soile variables of Saline habitat Jarjr-oma area.

Sand	1													
Silt	-1	1												
Clay	-1	1	1											
pH	1	-1	-1	1										
EC	1	-1	-1	1*	1									
N	-1	1	1	-1	-1*	1								
MC	-1	1	1	-1	-1	1	1*							
$NaCl^-$	-1	1	1	-1	-1	1	1	1						
Cl^-	1	-1	-1	1	1	-1	-1	-1	1					
$SO4^{--}$	1	-1	-1*	1	1*	-1*	-1*	-1	1*	1*				
Na^+	-1	1	1	-1	-1	1	1	1	-1	-1	1*			
K^+	-1	1	1	-1*	-1*	1*	1*	1*	-1*	-1*	1	1*		
Ca^{++}	-1	1	1*	-1*	-1*	1*	1*	1*	-1*	-1*	1*	1	1	
Mg^{++}	-1	1	1*	-1*	-1*	1*	1*	1*	-1*	-1*	1*	1	1	1
	Sand	**Clay**	**Silt**	**pH**	**EC**	**N**	**MC**	**NaCl**	**Cl**	**So**	**Na**	**K**	**Ca**	**Mg**

*Correlation is significant at 0.05 level (2-tailed)

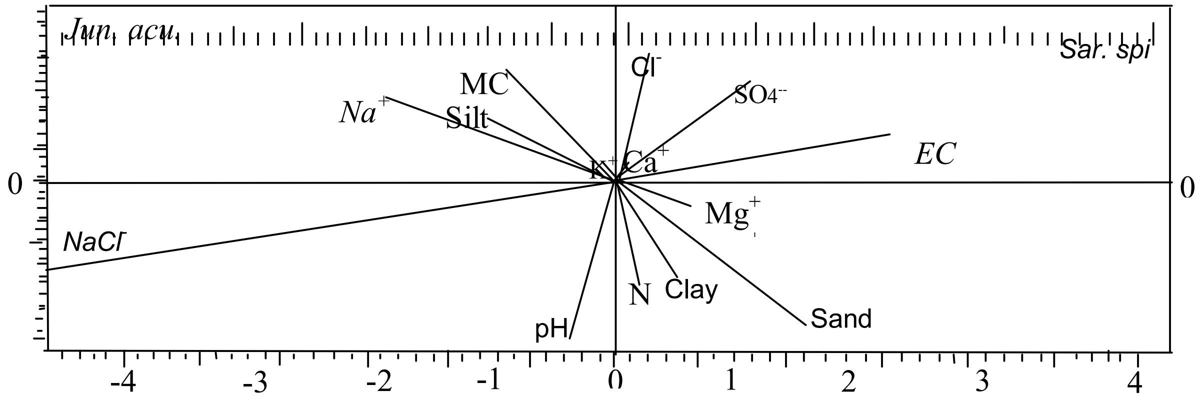


Fig. 10. PCA (principal components analysis) correlation ordination diagram between the different soile variables to stands with vegetation groups from TWINSPAN classification of the vegetation in Saline habitat Jarjr-oma area.

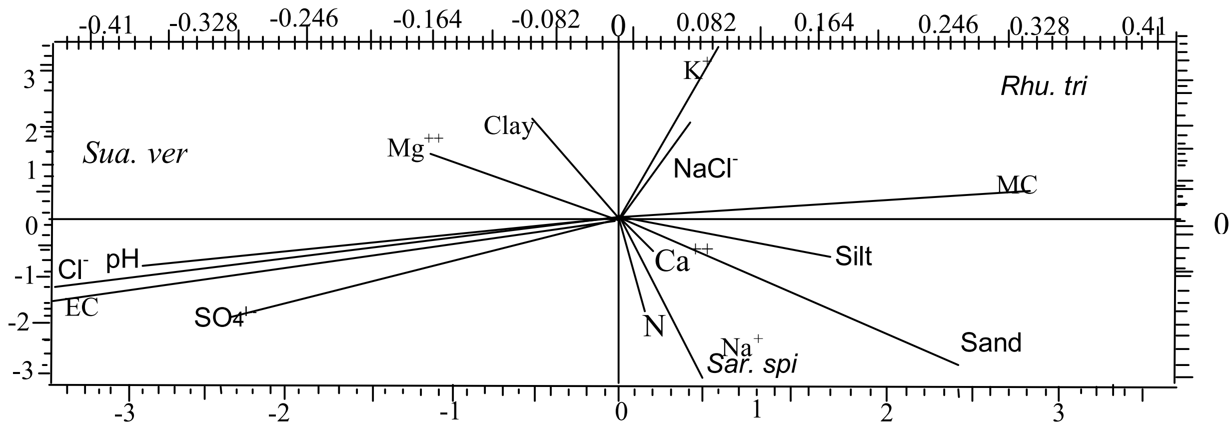


Fig. 11. PCA (principal components analysis) correlation ordination diagram between the different soile variables to stands with vegetation groups from TWINSPAN classification of the vegetation in Rocky coastal habitat Jarjr-oma area.

Table 11. Pearson-moment correlation (r) between the different soile variables of Rocky coastal habitat Jarjr-oma area.

Sand	1													
Silt	-0.98	1												
Clay	-0.94	0.87	1*											
pH	-0.35*	0.17	0.64	1										
EC	-0.44	0.60	0.12	-0.69*	1									
N	-0.33	0.5	0	-0.77	0.99	1								
MC	-0.37*	0.18	0.65	1	-0.68	-0.76	1							
$NaCl^-$	-0.09	0.28	-0.24	-0.90	0.94*	0.97	-0.89	1						
Cl^-	-0.79	0.65	0.94	0.86	-0.21	-0.33	0.86	-0.54	1					
$SO4^{--}$	-0.98	0.93	0.99*	0.51	0.27	0.15	0.53	-0.09	0.88	1				
Na^+	-0.59	0.73	0.29*	-0.55	0.98	0.96	-0.54	0.86	-0.04	0.43	1			
K^+	-0.93	0.98*	0.76	-0.01*	0.73	0.65	0	0.45*	0.51	0.85*	0.84	1		
Ca^{++}	-0.11	0.30	-0.22	-0.89	0.94	0.98	-0.88	1	-0.53*	0.07	0.87	0.47	1	
Mg^{++}	-1	0.99	0.94*	0.33	0.45*	0.35	0.35	0.11	0.77*	0.98	0.61*	0.94	0.13	1*
	Sand	Clay	Silt	pH	EC	N	MC	NaCl	Cl	So	Na	K	Ca	Mg

*Correlation is significant at 0.05 level (2-tailed).

Tables 12 - 16 showed family, Scientific name and presence * / absence in relation to each season. Three transects extended from the north to south with 12 stands. Vegetation in five habitats from all seasons which differ in their characteristics and consequently association type.

Table 12. Family, Scientific name and presence * / absence in relation to each season in year 2010/2011 in Salt march habitat of Jarjr oma area.

No.	Family	Scientific name	Au.	Wi.	Sp.	Su.
1	Aizoaceae	*Mesembryanthemum nodiflorum* L.			*	
2	Amaranthaceae	*Suaeda vera* Forak. ex Gmel.	*	*	*	*
3	Araceae	*Arisarum vulgare* Targ. Tozz	*	*		
4	Asteraceae	*Chlamydophora tridentata* Ehrenb. Ex Less.		*		
5		*Lactuca saligna* L.		*		
6	Brassicaceae	*Biscutella didyma* L.		*		
7	Crassulaceae	*Sedum sediforme* (Jacq.) Pau		*		
8	Euphorbiaceae	*Chrozophora tinctoria* (L.) Juss.			*	
9	Fabaceae	*Lathyrus aphaca* L.		*		
10		*Medicago polymorpha* L.	*			
11	Frankeniaceae	*Frankenia hirsuta* L.			*	
12	Geraniaceae	*Geranium molle* L.			*	
13	Myrsinaceae(1)	*Anagallis arvensis* L.		*		
14	Plantaginaceae	*Plantago coronopus* L.			*	
15	Plumbaginaceae	*Limoniastrum monopetalum* (L.) Boiss.	*	*	*	*
16	Poaceae	*Brachypodium retusum* (Pers.) P. Beauv.		*		
17		*Cynodon dactylon* (L.) Pers.			*	*
18		*Hordeum marinum* Huds.			*	
19	Solanaceae	*Lycium europaeum* L.	*	*	*	*
		Total species	5	11	10	4

Table 13. Family, Scientific name and presence * / absence in relation to each season in year 2010/2011 in Saline habitat of Jarjr oma area.

No.	Family	Scientific name	Au.	Wi.	Sp.	Su.
1	Aizoaceae	*Mesembryanthemum nodiflorum* L.			*	
2	Amaranthaceae	*Beta vulgaris* L.		*	*	
3		*Chenopodium murale* L.		*	*	
4		*Suaeda vera* Forak. Ex Gmel.	*	*	*	*
5	Amaryllidaceae	*Allium roseum L.*		*		
6		*Pancratium maritimum* L.		*	*	
7	Anacardiaceae	*Pistacia lentiscus* L.	*	*	*	*
8		*Rhus tripartite* (Ucria) Grande	*			*
9	Apiaceae	*Bupleurum lancifolium* Hornem		*		
10	Apocynaceae	*Caralluma europaea* (Guss.) N.E.Br.(2)			*	
11	Araceae	*Arisarum vulgare* Targ. Tozz	*	*	*	
12	Asparagaceae	*Asparagus.*(3) *aphyllus* L.			*	
13		*Bellevalia*(3) *sessiliflora* (Viv.) Kunth.	*	*		
14		*Drimia maritime* (L.) Baker.(4)	*	*		
15	Asteraceae	*Calendula arvensis* L.		*		
16		*Carduus getulus* Pomel		*	*	
17		*Carlina lanata* L.			*	
18		*Carthamus lanatus* L.			*	
19		*Centaurea aegialophila* Boiss & Heldr.		*		
20		*Centaurea alexandrina* Delile		*		
21		*Cichorium endivia* L(5).			*	
22		*Crepis senecioides ssp.senecioides* Delile			*	
23		*Crepis vesicaria ssp. vesicaria* L.			*	
24		*Cynara cornigera* Lindley		*	*	
25		*Hedypnois cretica* (L.) Dum.-Courset			*	
26		*Hypochoeris achyrophorus* L.			*	
27		*Leontedon hispidulus* (Delile) Boiss.			*	

28		*Leontedon tuberosus* L.	*	*	*	
29		*Matricaria aurea* (Loefl.) Sch. Bip.[6]		*		
30		*Onopordum cyrenaicum* Maire&Weiller	*	*	*	
31		*Phagnlon rupestre* (L.) Dc.	*	*	*	
32		*Senecio gallicus* Chiax		*		
33		*Silybum marinum* (L.) Gaertner			*	
34		*Urospermum dalechampii* (L.) Scop. ex F.W. Schmidt			*	
35	Brassicaceae	*Biscutella didyma* L.		*	*	
36		*Coronopus squamatus* (Forsk.) Ascherson		*		
37		*Rapistrum rugosum* (L.) All.			*	
38		*Sinapis alba* L.	*	*		
39	Caryophyllaceae	*Herniaria cinerea* Dc.			*	
40		*Herniaria glabra* Linn.			*	
41		*Paronychia arabica* (Linn.) Dc.		*	*	
42		*Polycarpon tetraphyllum* (L.) L.	*		*	
43		*Spergularia diandra* (Guss.) Heldr.&Sart.		*	*	
44	Convolvulaceae	*Convolvulus althaeoides* L.			*	
45		*Convolvulus supinus* Coss. Et Kral.		*		
46	Crassulaceae	*Sedum sediforme* (Jacq.) Pau			*	
47		*Umbilicus horizontalis* (Guss.)Dc.	*	*		
48	Cupressaceae	*Juniperus phoenicea* L.	*	*	*	*
49	Cyperaceae	*Carex divisa* Huds.		*		
50	Dioscoreaceae	Dioscorea communis (L.) Caddick&Wilkin[7]	*			
51	Dipsacaceae	*Scabiosa arenaria* Forskal			*	
52	Euphorbiaceae	*Mercurialis annua* L.	*	*	*	
53	Fabaceae	*Anthyllis tetraphylla* L.		*	*	
54		*Ceratonia siliqua* L.[8]			*	
55		*Lotus edulis* L.			*	
56		*Lotus ornithopodioides* L.	*	*		
57		*Lupinus* L.		*		
58		*Medicago polymorpha* L.			*	
59		*Medicago tornata* (L.) Mill.		*		
60		*Ononis hispida* Desf.		*		
61		*Retama raetem* (Forsk.) Webb		*	*	
62		*Trifolium scabrum* L.			*	
63		*Trifolium stellatum* L.			*	
64		*Vicia sativa* L.		*		
65		*Vicia tetrasperma* (L.) Schreb.		*		
66	Gentianaceae	*Centaurium pulchellum* (Swartz) Druce			*	
67	Geraniaceae	*Erodium malacoides* (L.) L'Herit.		*		
68		*Erodium moschatum* (L.) L'Herit.		*		
69		*Erodium touchyanum* Delile		*		
70		*Geranium molle* L.	*	*	*	
71	Iridaceae	*Moraea sisyrinchium* (L.) Ker Gawl		*		
72	Juncaceae	*Juncus acutus* L.			*	*
73	Lamiaceae	*Micromeria juliana* (L.) Benth. Ex Reichenb.			*	
74		*Micromeria nervosa* (Desf.) Benth.		*	*	
75		*Phlomis floccose* D. Don	*	*	*	*
76		*Prasium majus* L.	*	*	*	
77	Linaceae	*Linum strictum var.spicatum* Pers.		*	*	
78	Malvaceae	*Malva aegyptia* L.		*		
79		*Malva parviflora* L.	*	*		
80	Myrsinaceae	*Anagallis arvensis* L.	*	*		

81		*Cyclamen rohlfsianum* Aschers.			*	
82	Orobanchaceae	*Orobanche coelistis* (Reut.) Boiss.& Reut.		*	*	
83	Oxalidaceae	*Oxalis corniculata* L.	*			
84	Papaveraceae	*Glaucium flavum*			*	
85		*Papaver hybridum* L.		*		
86	Plantaginaceae	*Plantago coronopus* L.		*		
87		*Plantago cyrenaica* Durand & Barratte		*		
88		*Plantago ovata* Forskal		*		
89	Plumbaginaceae	*Limoniastrum monopetalum* (L.) Boiss.			*	*
90	Poaceae	*Brachypodium retusum* (Pers.) P. Beauv.		*	*	
91		*Bromus madritensis* L.			*	
92		*Elymus farctus* (Viv.)Runem.ex Melderis		*		
93		*Hordeum marinum* Huds.		*	*	
94		*Phalaris minor* Retz.			*	
95		*Stipa capensis* Thunb.			*	
96	Polygonaceae	*Emex spinosus* (L.) Camped		*		
97		*Polygonum equisetiforme* L.	*	*	*	*
98		*Rumex bucephalophorus* L.	*		*	
99	Posidoniaceae	*Posidonia oceanica* (L.) Delile		*		
100	Ranunculaceae	*Adonis microcarpa* DC.		*		
101	Rhamnaceae	*Ziziphus lotus* (L.) Lam.		*		
102	Rosaceae	*Sarcopoterium spinosum* (L.) Spach	*	*	*	*
103	Rubiaceae	*Crucianella maritime* L.	*	*		
104		*Sherardia arvensis* L.		*		
105		*Theligonum cynocrambe* L.		*		
106	Smilicaceae	*Smilax*[9] *aspera* L.			*	
107	Solanaceae	*Lycium europaeum* L.		*	*	*
108	Urticaceae	*Urtica urens* L.		*		
109	Valerianiaceae	*Fedia cornucopiae* (L.) Gaetner		*		
110	Xanthorrhoaeceae	*Asphodelus*[10] *microcarpus* Salzm.&Viv.	*			
111	Zygophyllaceae	*Zygophyllum album* L.		*		
		Total species	27	71	65	10

Table 14. Family, Scientific name and presence * / absence in relation to each season in year 2010/2011 in Rocky coastal habitat of Jarjr oma area.

No.	Family	Scientific name	Au.	Wi.	Sp.	Su.
1	Amaranthaceae	*Beta vulgaris* L		*		
2		*Chenopodium murale* L.		*	*	
3		*Suaeda vera* Forak. ex Gmel.	*	*	*	*
4	Amaryllidaceae	*Allium roseum* L		*		
5		*Pancratium maritimum* L.		*	*	
6	Anacardiaceae	*Pistacia lentiscus L.*	*	*	*	*
7		*Rhus tripartite* (Ucria) Grande	*	*	*	*
8	Apiaceae	*Ammi visnaga* (L.) Lam			*	*
9		*Bupleurum lancifolium* Hornem		*		
10		*Scandix australis* L.		*		
11		*Torilis leptophylla* (L.) Reichb			*	
12		*Torilis nodosa* (L.) Gaertn.	*	*	*	
13	Apocynaceae	*Caralluma*[2] *europaea* (Guss.) N.E.Br			*	
14		*Periploca*[2] *angustifolia* Labill.	*	*	*	*
15	Araceae	*Arisarum vulgare* Targ. Tozz	*	*	*	
16	Asparagaceae	*Asparagus aphyllus* L.			*	*
17		*Asparagus stipularis* Forsk.	*			
18		*Bellevalia sessiliflora* (Viv.) Kunth	*	*		

19		*Dipcadi*[3] *serotinum* (L.) Medic.			*	
20		*Drimia maritime* (L.) Baker	*	*	*	
21		*Ornithogalum tenuifolium* Guss[3]		*		
22		*Scilla*[3] *peruviana* L.	*	*	*	
23	Asteraceae	*Anthemis secundiramea* Biv.		*	*	
24		*Calendula arvensis* L.	*	*	*	
25		*Carlina lanata* L.			*	
26		*Carthamus lanatus* L.			*	
27		*Centaurea aegialophila* Boiss & Heldr		*		
28		*Centaurea alexandrina* Delile	*	*	*	
29		*Chlamydophora tridentata* Ehrenb. Ex Less			*	
30		*Cichorium endivia* L.			*	
31		*Cichorium spinosum* L.			*	
32		*Crepis senecioides* ssp.senecioides Delile		*	*	
33		*Crepis vesicaria* ssp. *vesicaria* L.			*	
34		*Cynara cornigera* Lindley	*	*	*	
35		*Hedypnois cretica* (L.) Dum. – Courset			*	
36		*Hyoseries scabra* L		*	*	
37		*Hypochoeris achyrophorus* L.			*	
38		*Leontedon hispidulus* (Delile) Boiss			*	
39		*Leontedon tuberosus* L.	*	*	*	
40		*Matricaria aurea* (Loefl.) Sch. Bip.		*		
41		*Onopordum cyrenaicum* Maire & Weiller	*	*		
42		*Pallenis spinosa* (L.) Cass			*	
43		*Phagnlon rupestre* (L.) Dc.	*	*	*	
44		*Picris asplenoides* L.			*	
45		*Senecio gallicus* Chiax		*		
46		*Silybum marinum* (L.) Gaertner			*	
47		*Urospermum dalechampii* (L.) Scop. ex F.W. Schmidt			*	
48	Brassicaceae	*Biscutella didyma* L.		*	*	
49		*Coronopus squamatus* (Forsk.) Ascherson		*		
50		*Enarthrocarpus pterocarpus* (pers.) Dc.		*		
51		*Rapistrum rugosum* (L.) All			*	
52		*Sinapis alba* L		*		
53	Caryophyllaceae	*Herniaria cinerea* Dc.			*	
54		*Herniaria glabra* Linn			*	
55		*Paronychia Arabica* (Linn.) Dc		*	*	
56		*Polycarpon tetraphyllum* (L.)	*	*	*	
57		*Spergularia diandra* (Guss.) Heldr. & Sart		*		
58	Cistaceae	*Fumana thymifolia* (L.) Spach			*	
59	Colchicaceae	*Colchium palaestinum*	*	*		
60	Convolvulaceae	*Convolvulus althaeoides* L.			*	
61		*Convolvulus supinus* Coss. Et Kral		*	*	
62	Crassulaceae	*Sedum sediforme* (Jacq.) Pau.		*	*	
63		*Umbilicus horizontalis* (Guss.)Dc.	*	*		
64	Cucurbitaceae	*Bryonia cretica* L.	*			
65	Cupressaceae	*Juniperus phoenicea* L.	*	*	*	*
66	Cyperaceae	*Carex divisa* Huds.		*	*	
67	Dipsacaceae	*Scabiosa arenaria* Forskal		*	*	
68	Euphorbiaceae	*Euphorbia falcata* L.			*	
69		*Euphorbia peplus* L.		*		
70		*Mercurialis annua* L.	*	*	*	
71	Fabaceae	*Anthyllis tetraphylla* L.		*	*	

72		*Ceratonia siliqua* L.			*	
73		*Lotus edulis* L.			*	
74		*Lotus ornithopodioides* L.	*	*	*	
75		*Lotus tetragonolobus* L.(11)		*		
76		*Lupinus* L.		*		
77		*Medicago polymorpha* L		*		
78		*Medicago tornata* (L.) Mill.		*		
79		*Melilotus sulcatus* Desf		*		
80		*Ononis hispida* Desf		*		
81		*Retama raetem* (Forsk.) Webb		*	*	
82		*Trifolium tomentosum* L.			*	
83		*Trigonella maritima* Del. ex Poir.			*	
84		*Trigonella stellata* Forsk.	*	*		
85		*Vicia sativa* L.		*		
86		*Vicia tetrasperma* (L.) Schreb		*		
87	Frankeniaceae	*Frankenia hirsuta* L			*	
88	Geraniaceae	*Erodium malacoides* (L.) L'Herit.	*	*		
89		*Erodium moschatum* (L.) L'Herit.		*		
90		*Erodium touchyanum* Delile		*	*	
91		*Geranium molle* L.	*	*	*	
92	Iridaceae	*Moraea sisyrinchium* (L.) Ker Gawl		*		
93	Juncaceae	*Juncus acutus* L.	*	*	*	*
94		*Juncus subulatus* Forsk.			*	
95	Lamiaceae	*Micromeria juliana* (L.) Benth. Ex Reichenb.			*	
96		*Micromeria nervosa* (Desf.) Benth		*	*	
97		*Phlomis floccose* D. Don	*	*	*	*
98		*Prasium majus* L.	*	*	*	*
99		*Teucrium barbeyanum* Aschers	*	*	*	
100	Linaceae	*Linum bienne* Mill.		*	*	
101		*Linum nodiflorum* L.		*		
102		*Linum strictum* var.spicatum Pers.			*	
103	Malvaceae	*Malva aegyptia* L.		*	*	
104		*Malva parviflora* L.	*	*		
105	Myrsinaceae	*Anagallis arvensis* L.	*	*		
106		*Asterolinon linum- stellatum* (L.) Duby		*		
107		*Cyclamen rohlfsianum* Aschers	*	*	*	
108	Orobanchaceae	*Orobanche coelistis* (Reut.) Boiss. & Reut		*	*	
109	Papaveraceae	*Glaucium flavum*			*	
110		*Papaver hybridum* L.		*		
111	Plantaginaceae	*Plantago coronopus* L.		*		
112		*Plantago cyrenaica* Durand & Barratte		*		
113		*Plantago lagopus* L.			*	
114		*Plantago ovata* Forskal		*		
115	Plumbaginaceae	*Limoniastrum monopetalum* (L.) Boiss	*	*	*	*
116		*Limonium sibthorpianum* (Guss.) O. Ktze	*	*	*	*
117	Poaceae	*Avena barbata* Pott ex Link		*	*	
118		*Brachypodium retusum* (Pers.) P. Beauv.			*	
119		*Bromus madritensis* L.			*	
120		*Bromus rigidus* Roth		*	*	
121		*Dactylis glomerata* L.			*	
122		*Elymus farctus* (Viv.)Runem.ex Melderis		*		
123		*Hordeum marinum* Huds		*	*	
124		*Hordeum murinum ssp leporinum* (Link) Arcang.		*		

125		*Lamarckia aurea* (L.) Moench			*	
126		*Phalaris minor* Retz.			*	
127		*Phragmites australis* (Cav.) Trin. ex Steud.			*	
128		*Polypogon monspeliensis* (L.) Desf.			*	
129		*Stipa capensis* Thunb.			*	
130		*Trachynia distachya* (L.) Link.			*	
131		*Trisetaria macrochaeta* (Boiss.) Maire			*	
132	Polygonaceae	*Emex spinosus* (L.) Camped		*		
134		*Polygonum equisetiforme*		*	*	
135		*Rumex bucephalophorus* L.	*	*		
136		*Rumex crispus* L.			*	
137	Posidoniaceae	*Posidonia oceanica* (L.) Delile.		*		
138	Ranunculaceae	*Adonis microcarpa* DC		*		
139		*Nigella arvensis* L.			*	
140		*Ranunculus asiaticus* L.		*		
141	Rhamnaceae	*Ziziphus lotus* (L.) Lam		*		
142	Rosaceae	*Sarcopoterium spinosum* (L.) Spach	*	*	*	*
143	Rubiaceae	*Crucianella maritima* L.	*	*		*
144		*Galium verrucosum* Huds		*		
145		*Sherardia arvensis* L.		*	*	
146		*Theligonum cynocrambe* L.[(12)]	*	*	*	
147	Smilicaceae	*Smilax aspera* L.			*	
148	Solanaceae	*Lycium europaeum* L.		*	*	*
149	Urticaceae	*Urtica urens* L.		*		
150	Valerianiaceae	*Valerianella petrovichii* Ascherson		*		
151		*Fedia cornucopiae* (L.) Gaetner		*		
152	Xanthorrhoaeceae	*Asphodelus microcarpus* Salzm.& Viv.	*	*	*	*
153	Zygophyllaceae	*Zygophyllum album* L.		*		
		Total species	40	103	100	16

Table 15. Family, Scientific name and presence * / absence in relation to each season in year 2010/2011 in Sandy beach habitat of Jarjr oma area.

No.	Family	Scientific name	Au.	Wi	Sp.	Su.
1	Amaranthaceae[(13)]	*Salsola kali* L.				*
2		*Suaeda vera* Forak.ex Gmel		*	*	*
3	Amaryllidaceae	*Allium*[(14)] *roseum* L.		*		
4		*Allium rumherianum* Asch.	*			
5	Asteraceae	*Anthemis secundiramea* Biv		*	*	
6		*Cichorium spinosum* L.	*	*	*	*
7		*Launaea foxii* (Post) Eig		*		
8	Brassicaceae	*Cakile aegyptica* (L.) Willd.				*
9	Caryophyllaceae	*Silene colorata* Poiret		*	*	
10	Colchicaceae[(15)]	*Colchium palaestinum* Baker.[(16)]	*			
11	Convolvulaceae	*Cressa cretica* L.				*
12	Euphorbiaceae	*Euphorbia paralias* L.				*
13		*Euphorbia peplis* L.				*
14	Fabaceae	*Lotus halophilus* Boiss. Et Sprun		*	*	
15		*Medicago polymorpha* L.			*	
16		*Ononis vaginalis* Vahl		*	*	*
17		*Trifolium purpureum* Lois.			*	
18		*Trigonella stellata* Forsk.			*	
19	Frankeniaceae	*Frankenia hirsuta* L.			*	
20	Iridaceae	*Moraea sisyrinchium* (L.) Ker Gawl[(17)]		*		
21	Juncaceae	*Juncus acutus* L.	*	*	*	*

22	Plantaginaceae	*Plantago ovata* Forskal			*	
23	Plumbaginaceae	*Limonium sibthorpianum* (Guss.) O. Ktze.	*	*	*	*
24	Poaceae	*Cynodon dactylon* (L.) Pers.	*	*	*	*
25		*Elymus farctus* (Viv.)Runem.ex Melderis(18)		*	*	
26		*Sporobolus pungens* (Schreb.) Kunth				*
27		*Triplachne nitens* (Guss.)Link			*	
28	Polygonaceae	*Emex spinosus* (L.) Camped			*	
29		*Polygonum maritimum* L.				*
30	Rosaceae	*Sarcopoterium spinosum* (L.) Spach	*	*	*	
31	Rubiaceae	*Crucianella maritima* L.	*			
32	Tamaricaceae	*Tamarix tetragyna* Ehrenb.	*	*	*	*
33	Zygophyllaceae	*Zygophyllum album* L.		*	*	*
		Total species	10	16	20	15

Table 16. Family, Scientific name and presence * / absence in relation to each season in year 2010/2011 in Sand formation habitat of Jarjr oma area.

No.	Family	Scientific name	Au.	Wi.	Sp.	Su.
1	Amaryllidaceae	*Pancratium maritimum* L.		*	*	
2	Asteraceae	*Centaurea aegialophila* Boiss & Heldr.		*	*	
3	Cyperaceae	*Carex divisa* Huds.		*	*	
4	Fabaceae	*Retama raetem* (Forsk.) Webb	*	*	*	*
5	Nitrariaceae	*Nitraria retusa*(19) (Forsk.) Aschers.	*	*	*	*
6	Posidoniaceae	*Posidonia oceanica* (L.) Delile			*	
7	Rubiaceae	*Crucianella maritima* L.	*	*		*
8	Zygophyllaceae	*Zygophyllum album* L.		*	*	*
		Total species	3	7	7	4

Tables (5-9) to motion:

(1) Anagallis,Cyclamen derive from Primulaceae family and enter the newly to Myrsinaceae family (Wikipedia, 2012).

(2) Genus Caralluma and periploca was followed Asclepidiaceae family, but now Asclepidiadoideae is subfamily to Apocynaceae family (Mary and Peter, 2000).

(3) Genus Asparagus, Bellevalia, Dipcadi, Drimia, Ornithogalum, and Scilla was followed family Liliaceae but became follows Asparagaceae family. (Chase *et al.,* 2009).

(4) Synonyms name to genus *Drimia maritima* (L.) Stearn was called *Urginea maritima* (L.) Baker. (Wikipedia, 2012).

(5) Synonyms name to species *Cichorium pumilum* Jacq, was called Cichorium endivia L. (Boulos, 2002).

(6) Genus *Matricaria aurea* (Loefl.) Sch. Bip synonyms name *Chamomilla aurea* (Loefl.) Gay ex Cosson & Kralik (Boulos, 2002).

(7) Synonyms name to genus *Dioscorea communis* (L.) Caddick&Wilkin was called *Tamus communis* L. (Wikipedia, 2012)

(8) Genus Ceratonia siliqua L. It was Caesalpinaceae family recently it has become Fabaceae family. (Martin *et al.,* 2006).

(9) Smilax genus changed from Liliaceae family to Smilicaceae family (Flora of North America, 2008).

(10) Genus Asphodelus was followed liliaceae family (Jafri and El-Gadi, 1977), also was followed Asphodelaceae (Boulos, 2005), but recently it has become Xanthorrhoaeceae family (Chase *et al.,* 2009).

(11) Genus and species to Lotus tetragonolobus L. was called Tetragonolobus purpureus Moench. (Boulos, 1999).

(12) Theligonum cynocrambe L. It was Theligonaceae family but joined the family Rubiaceae. (The World Checklist. 2012).

(13) Amaranthaceae was called Chenopodiaceae family, but recently Chenopodiaceae subfamily Chenopodioideae (APG, 2003).

(14) Genus Allium was followed family Alliaceae, recently followed family Amaryllidaceae, Alliaceae = Allioideae recently subfamily for Amaryllidaceae (Chase *et al.,* 2009).

(15) Family Colchicaceae derived from family Liliaceae (Boulos,2005).

(16) Synonyms name to genus Colchium was Androcymbium (Vinnersten and Manning, 2007; Manning and Vinnersten, 2007). Also, species Androcymbium palaestinum Baker. (Boulos, 2002) was called Androcymbium gramineum (Cav.) Mc Bride (Jafri and El-Gadi, 1977).

(17) Genus Moraea sisyrinchium (L.)Ker Gaweler was called Iris sisyrinchium L (Boulos, 2005).

(18)Synonyms name to Elymus farctus (Viv.) Runem.ex Melderis was Elytrigia juncea (L.) Nevski (Flora of Egypt,2005)

(19) Nitraria retusa was Zygophyllaceae family but recently Nitrariaceae family (Jafri and El-Gadi, 1977 and Wikipedia, 2012).

In table 17 gave the highest similarity coefficient Jaccard's in Jarjr-oma between Rocky coastal and Saline by 39%, while the Rocky habitat in Al-Mansora which altitude 309.4 meters and Jarjr-oma altitude 1 meter gave Jaccard's coefficient of 22.6%, while given lower coefficient Jaccard's Jarjr-oma between Sand formation, Sandy Beach and Rocky habitats and There is no common types between Sand formation and both Rocky coastal and Salt march.

Climatic

Rainfall**:** As shown in the climate diagram Fig. 12 the maximum rainfall was Meteorological station

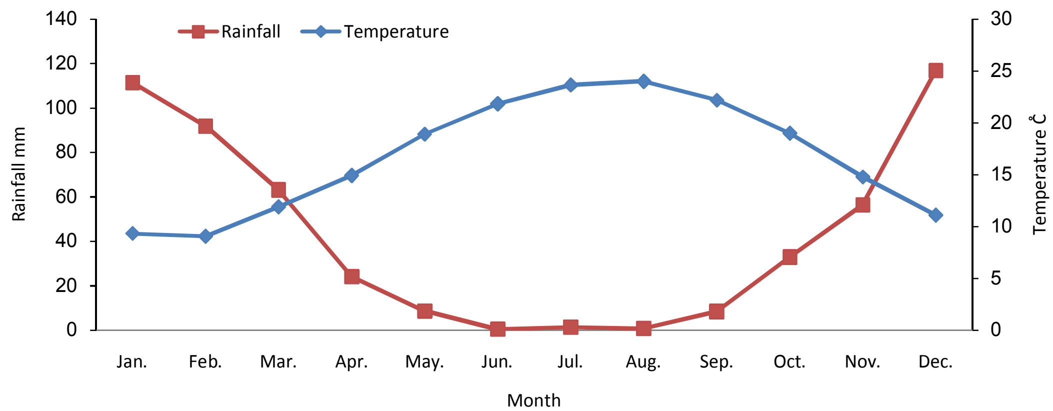
Al Baida actress for Jarjr-oma region, 131.3 and 191.6 mm in December and January, respectively, 116.8 and 111.4 mm in December and January, respectively, at Meteorological Station Shahat actress Mansoura region. The average rainfall 550.5 mm/year in Al Baida station and 515.9 mm/year at the meteorological station Shahat for the period from 1999 to 2009.

Temperature: In the study area, the dry period extends from June to Augustus. The highest mean temperature meteorological station Shahat imitation Al Mansora region and meteorological station Al Baida imitation Jarjr-oma for years 1999 to 2009 about 24 ˚C through Augustus month. The lowest mean is 9 ˚C in January and February in Shahat, While in Al Baida 10 and 9.7 ˚C in January and February, respectively.

Table 17. Similarity equation by Jaccard's coefficient

Area		Al- Mansora	Jarjr-oma				
	Habitats	**Rocky**	**Salt march**	**Saline**	**Rocky**	**Sandy Beach**	**Sand formation**
Al- Mansora	**Rocky**	-	-	-	-	-	-
	Salt march	3.1	-	-	-	-	-
	Saline	18.9	10	-	-	-	-
	Rocky	22.6	8.1	39	-	-	-
Jarjr-oma	**Sandy Beach**	3.8	7.7	6.9	8.1	-	-
	Sand formation	0	0	5.9	3.7	4.9	-

(a)



(b)

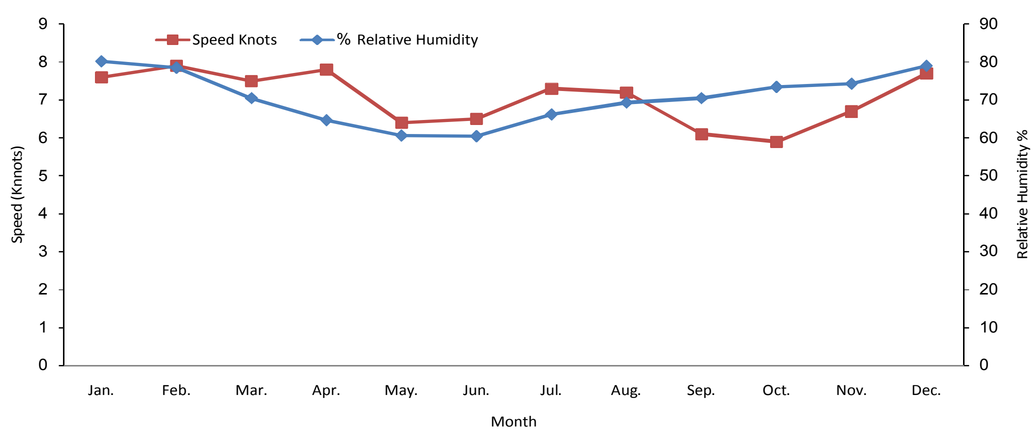
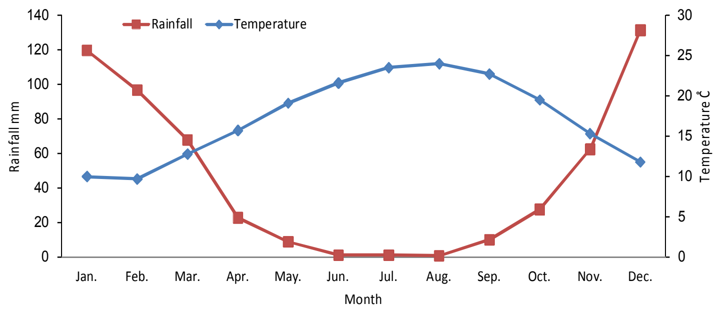


Fig. 12. Climate diagram as based on data from Libyan nation meteorological center in Shahat for years (1999 to 2009). (a) Mean monthly variation of temperature C˚ and rainfall (mm). (b) Mean monthly variation of relative humidity (%) and wind speed (Knots).



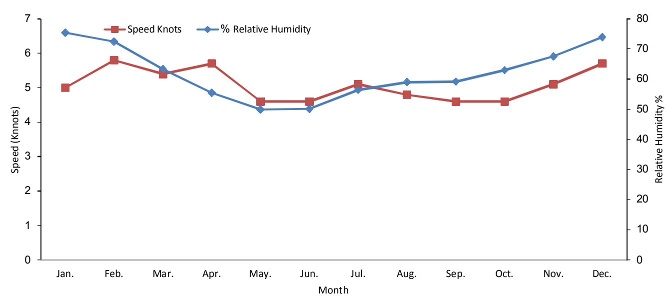


Fig. 13. Climate diagram as based on data from Libyan nation meteorological center in Al Baida for years (1999 to 2009). (a) Mean monthly variation of temperature C° and rainfall (mm). (b) Mean monthly variation of relative humidity (%) and wind speed (Knots).

Relative humidity: The Relative humidity as shown Fig. 13 varied during the different season of the year. The highest mean relative humidity is 80.2 % and 75.4 % as recorded in January Shahat and Al Baida, respectively, and lowest mean value is 61 % and 50 % recorded in May and June in Sahat and Al Baida, respectively.

Wind speed: Soil with thin plant cover, is subject to the action of wind erosion and moving sand. The highest mean wind speed is 7.9 and 5.8 Knots recorded in February in Shahat and Al Baida, respectively.

Discussion and Conclusions

Combined information from species–area curves and measures of heterogeneity with information on the area covered by each vegetation type and found that the types making the greatest contributions to regional biodiversity covered the smallest areas. This approach may provide an accurate and relatively rapid way to rank hotspots of plant diversity within regions of interest (Chong and Stohlgren, 2007). Natural plant life in any of the regions it is only a product of the interaction of several factors, the most important climatic factors and factors Earth's surface topography and soil type. The climatic factors most important of these factors, as they affect a direct impact on the nature of the plant life.

The diversity index is one measure ecologists use to quantify species diversity to compare different environments. One of the most commonly used indices is the Shannon Index. The advantage to using this formula is that it takes into account the species richness or the number of species present. The native diversity index measures the diversity of native plants. Differentiation of habitats would lead to an increase in â (beta) diversity, which is a measure of biological diversity between habitats, enhancing, in turn, the ã (gamma) diversity at a regional level (Whittaker,1972, Magurran, 1988 and Mumby, 2001).

The Jaccard index, also known as the Jaccard similarity coefficient originally coined coefficient de communaut by Paul Jaccard, is a statistic used for comparing the similarity and diversity of Sample statistics sample sets. The Jaccard coefficient measures similarity between sample sets, and is defined Jaccard s index and species diversity. Gave the highest similarity coefficient Jaccard's in Jarjr-oma between Rocky coastal and Saline by 39%, while the Rocky habitat in Al-Mansora which altitude 309.4 meters and Jarjr-oma altitude 1 meter gave Jaccard's coefficient of 22.6%, while given lower coefficient Jaccard's Jarjr-oma between Sand formation, Sandy Beach and Rocky Coastal habitats.

In general, the number of species in Jarjar-oma 179 species in four seasons for all habitats, while Al-Mansora 175 species which includes habitat for rock only while as Jarjar-oma record 153 species in the habitat Rocky in the winter 103 species , followed by the spring of 100 species and decreased in the winter to 40 and low to 10 species in the summer, followed by the habitat Saline which the number of 111 species and appearance of the higher species of winter arrived to 71, followed by spring 65 species and less appearance of species was in the Sand formation habitat 8 species followed by Salt March reached 19 only species. The species generally risen in the winter and spring in all habitats.

Analytical characteristics of the plant communities attributes indicate to the installation of the community and determine the degree of similarity between the different communities, destination florisetc compositino plant species census that make up the community and its statement, this selection is the first and most important phase of the study the vegetation community, but in practice we find that to obtain a list of all existing species is not easy to achieve, and then the workers studies environment plant communities satisfied by selecting the names of vascular plant species (Badr, 2007). Plants that grow in the Rocky habitat called Litophytes. The analysis of vegetation of Rocky ridges and similar areas of shallow soils by the ecological profile technique (Kamal, 1982). Dwarf-shrub formations linked to soils with rocky emergences (Brullo and Furnari, 1981).

The plants that grow in the habitat as much as salts are called saline plants some plants can live in the habitat of moderation and salty habitat and called Facultative halophytes, In areas close to the sea Seawater saturated soil and air higher plant holds grains of salt, found salt excretive halophytes species such as *Tamarix tetragyna* Ehrenb, and the species salt cumulative halophytes such as *Juncus acutus* L. and species succulent such as *Suaeda vera* Forak.ex Gmel and *Zygophyllum album* L. It is known that plants adapt to the environmental conditions of the habitat it live. Halophytes represent in fact a heterogeneous ecological group of plants; not only the high salinity represented the single factor "building" the history of these plants during the evolution, but here were also several additional ecological factors that contributed to this. So, describing halophytes only in relation to salinity could be reductionist. (Grigore *et al.*, 2010). The most species of the salt marsh is dominated by the tall rush *Juncus maritimus* var. *ustraliensis* (Partridge and Wilson, 1988).

The Sandy beach is a harsh environment. Crashing waves, the daily ebb and flow of the tides, and the action of currents keep coastal ocean waters in constant motion. This water movement also carries the sand below it, changing the beach slightly with each wave and noticeably over seasons.

The vegetation ordination indicates a sequence of communities correlated with soil moisture, salinity. Nonsaline depressions and Rocky coastal habitats had higher species richness and low species dominance, this in contrast to the salt marsh plant communities (El-Sheikh and Abbadi, 2004).

It is well known that the success of halophyte populations, especially for annuals which have only one opportunity in their life history for reproducing, is greatly dependent on the germination responses of their seeds (Ungar, 1991). The germination of seeds for most halophytes occurs during periods of the year when soil salinity levels are reduced (Ungar, 1978).

In these habitats, find a certain number of psammophytes with a large Mediterranean distribution (Brullo and Furnari, 1981).

The most important edaphic variables affecting the distribution and structure of the plant communities are salinity, moisture content and fine fractions, nevertheless $CaCO_3$ content seems to be more effective in the Dakhla Oasis (Abd El-Ghani, 2000).

The prevailing climatic conditions are typical of the Mediterranean region characterized by variability and unpredictability. The rainfall is erratic in quantity, frequency and distribution (Al-Idrissi *et al*., 1996). Correlating climatic variables (growing season, temperature) and geographical variables (area, latitude, longitude) with species richness showed that nonnative species richness was most strongly correlated with longitude (Clemants, 2003). It was noticed that a strong correlation of native species richness with latitude and elevations due to climatic differences present at different latitudes and elevations.

Edaphic factors affect species diversity more than climate does (Mac Arthur, 1972, Whittaker, 1972 and Cody, 1975). Species richness and Simpson's index of diversity in spring increased than in autumn in all sites of both years in Mediterranean Sea (El-Zanaty *et al.*, 2010).

The higher diversity of these communities may be related to the highest number of perennial species agree with (El-Darier, 1994).

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