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CHECK LIST OF FLORA AND VEGETATION ON SOUTH EL-MARJ ZONE: SOUTH EL-JABAL EL-AKHADAR – LIBYA

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ABSTRACT: Water is very important. People use it for drinking, cooking clothes, cleaning materials and recreation. It is vital that water must be free from contaminants that may pose health hazards to living things. Heavy metals are among the toxicants in the environment that are not readily degraded such that once introduced, it will stay there indefinitely. Heavy metals, like lead which this study is focused on may cause adverse health effects to children and adults. Literature review have provided evidences that lead may be implicated in the occurrences of several diseases, primary of which may be related to neurological dysfunctions. This study focused on the detection and quantification of lead (Pd) concentration in tap and deep well water sources from twenty-four residential areas in the city of Manila and water from Baywalk, Roxas Boulevard Manila during summer when recreational activities occur, comparative to the set standard limit. It compared the levels of lead concentration in tap and deep well water. The analysis made use of Flameless Atomic Absorption Specttrophotometry (FAAS). The mean lead concentration for all tap water samples was found as 0.6059 ppm. Mean lead concentration for deep well water samples was 0.4489 ppm, while that for Baywalk was 2.4801 ppm. Samples obtained from tap, deep well and Baywalk water sources, fell above the 0.015ppm imposed by United States Environmental protection Agency (US EPA) limits. This standard limit is used as basis in the Philippines. Shore soil in Baywalk showed a mean of 3.2229 ppm. The lead in the soil contributes to the lead source in the water and vice versa. As the concentration of lead in Baywalk soil is very high compared to EPA standard limit, coming in contact with it may prove hazardous. Thus, given the results of this study wherein no sample conformed to the US EPA standard, it is recommended that the manila, Philippines should begin regular surveillance on lead contamination in water sources from representative areas and their correlation on possible toxicological findings in the consumers. Likewise the government must also take environment clean up initiatives and draft policies to help lessen lead burden in Manila.

KEYWORDS: EL-Jabal EL-Akhdar; Floristic study; Biological spectrum; Endemic species; Flora of Libya

❖ INTRODUCTION

EL-Jabal EL-Akhdar mountain lies along the north-eastern coast of Libya, it extends between Marmarica plateau to the east and Benghazi plain to the west. This region is characterized by plant intensity and diverse areas of forest and grassland dominated by maquis vegetation. The aridity increases gradually as we move southward away from the coast. This region has been inhabited since ancient times, human activities that have caused great pressure on plants in this region were: gathering firewood, compilation of certain species, and land clearing of vegetation for agriculture operations, as well as grazing. This study is a complement to those studies concerned with the detailed study of specific areas of EL- Jabal El-Akhdar, which includes some highlands and valleys, as in the study of Asker (1998) of vegetation and flora in the AL-Asraa valley in which 244 species were collected. 317 species were collected from Ager valley in the study of EL-Hamadi (1999). In the study of AL-Juhary (2002) 336 species were collected from Zaza valley. 192 species were collected from highlands of Albakur (Abdul Khaliq, 2007).

❖ THE STUDY AREA

The study area is located on the first terrace of EL-Jabal EL-Akhdar mountain, , which lies about 8 km south of AL-Marj city (the old city of Barce), it extends south-east from Sas until EL-Kharooba villages a distance of about 60 kilometers, coordinates 20:45 - 21:15 east and 32:00 - 32:30 north. The soils differs from one location to another, where the soil is clay (Redsina) in the prairie at the edge of the study area from the north, while the alluvial soil is dry in the southern regions near Jardas and EL-Kharooba villages, sandy soils are found in some valleys in the south.

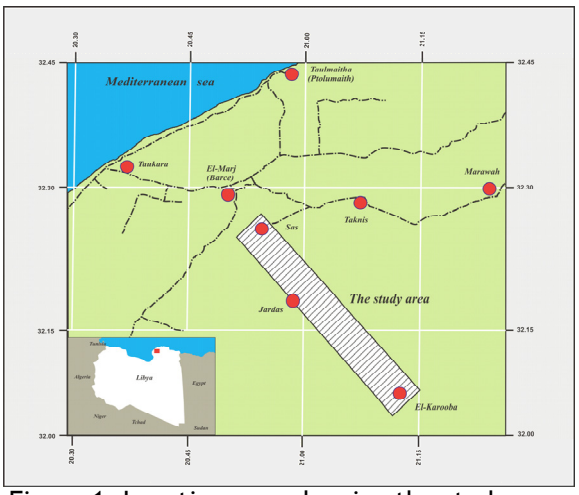

Figure 1: Location map showing the study area

The northern region of the study area is influenced by the Mediterranean climate, which is characterized by hot dry summers, and mild rainy winters. The south has a dry climate as of a semi-desert, showing poor rainfall and high evaporation rates and a clear appearance of aridity which prevails overall in the south of EL-Jabal EL-Akhdar. The climatic characteristics come from EL-Marj meteorological station, the nearest to the study area. The average annual rainfall is 380 mm/year. December, January and February have the highest rates of rainfall and lower temperatures during the year, while the average annual temperature was 18.8 degrees Celsius. The highest relative humidity appears in January and February, with an average of 71%, and decreased during May and June with an average of 50%, the highest wind speed appears in December, January and February, which amounted to 10 miles/hour, the average annual wind speed was 8.6 mile/hour.

❖ Material And Methods

The study area was divided into 6 sub-regions. Due to the divergest dates of species during germination, growth and flowering, plant samples were collected throughout the yeas 2007/2008 to enable the compilation of complete growth samples. After collection the samples were immediately compressed before any damage could occur to their parts. After drying the samples they were mounted on Herbarium sheets, freezed for sterilization at minus 30 degrees Celsius for 48 hours, then they were identified in Corina herbarium (Cyrene), botany department, Faculty of Sciences, Garyounis University, Benghazi, according to the Flora of Libya. The plant species were arranged and catalogued according to Angler system of classification (1964), and deposited in Corina herbarium. The analysis of biological spectrum of the collected samples was done according to Raunkairs classification (1934).

❖ Results And Discussion

A total of 189 plant species were collected from the study area, belonging to 134 genera and 47 families, which consist of 9.1% of the plant species in Libya, and about 13.5% of the species in the eastern region of Libya (Cyrenaica). This coincides with the findings of Abdul Khaliq (2007) who collected 192 species in the heights of Albakur hills at the northern coast of Al-Marj area (the old city of Barce), but less than the collections of Asker (1998) who collected 244 species from AL-Asraa valley, and the collections of AL-Hamedi (1999) who collected 317 species from AL-Aqar Valley, as well less than the collections of AL-Juhary (2002) who collected 336 species from Zaza valley at the first terrace of EL-Jabal EL-Akhdar mountain. The increase in the number of species in these valleys in the recent study areas is due to it's northern location which gets larger amounts of rainfall, in addition these valleys have more moderate temperatures. Generally the valleys in EL-Jabal EL-Akhdar contain greater numbers of plant species compared to other open areas, due to the fact that the open areas studied are most affected by human activities, while valleys have better environmental conditions in terms of soil moisture and also greater protection from wind effects, so they have more plant diversity and density. The valleys harbor many plant species that receded from high open areas, and this coincides with AL-Juhary (2002) that natural vegetation is concentrated in valleys because of the availability of appropriate factors for the growth of intensive plants. The distribution of perennial plant species forms the permanent framework of the vegetation in the study area is as follow:

1. Stand I: Elevation 402 meter above sea level. Coordinates 32:25 N & 020:52 E.
The region represents the beginning of the study area from the north, and is characterized by rough terrain, where the main human activity is rain-fed grain cultivation (wheat and barley).
2. Stand II: Elevation 509 meter above sea level. Coordinates 32:22 N & 020:55 E.
This region is characterized by frequent upland valleys and a high density of vegetation.
3. Site III: Elevation 515 meter above sea level. Coordinates 32:18 N & 020:54 E.
This site is open and it is one of the most intensive sites with Juniperus phonecia.
4. Stand IV: Elevation 652 meter above sea level. Coordinates 32:18 N & 020:58 E.
This region shows the effects of erosio revealing the bed rocks. It is a poor site in vegetation coverage, and Pistacia lentiscus has disappeared.
5. Stand V: Elevation 514 meter above sea level. Coordinates 32:16 N & 021:04 E. Elevation 514 m.
At the edge of this region, land cover changes from maquis to semi-arid and desert plants, Juniperus phonecia has began to disappear.

6. STAND VI: Elevation 287 meter above sea level. Coordinates 32:10 N & 021:11 E.
In this region the dry desert vegetation (xerophytes) becomes more pronounced and widespread.

The greatest expression of vegetation is in the more sheltered area represented by Maquis vegetation species like Sarcopoterium spinosum, Asphodelus ramosus, Juniperus phoenicea spread through elevations 402, 509, 514 and 652 meter above sea level, at coordinates 32:25 N & 020:52 E; 32:22 N , 020:55 E; 32:18 N & 020:54 E and 32:18 N & 020:58 E. The homogenous aspects of vegetation and xerophilous were very fragmented and degraded, not only on account of the rough herritory and hard edophic conditions but especially because of sequential authropic pressure due to deforestation, fire and quarring. Species like Phlomis floccose, Pistacia lentiscus, Rhamnus lycioides and Ziziphus lotus have heterogeneity distribution through the area but they are limited within coordinates 32:25 N & 020:52 E; 32:22 N , 020:55 E and 32:18 N & 020:54 E. While species like Olea europaea grow only at coordinate 32:25 N & 020:52 E and elevation 402 m. Thymus capitatus is present at coordinates 32:22 N , 020:55 E elevation 509, 32:18 N & 020:58 E; Elevation 652 m, 32:16 N & 021:04 E Elevation 514 m and at 32:10 N & 021:11 E Elevation 287 m. Capparis spinosa grows only at coordinate 32:22 N, 020:55 E elevation 509 m. When more dry conditions, almost desert conditions, are prevailing at coordinates at 32:10 N & 021:11 E Elevation 287 m, the lowest zone (Kharruba species like Atriplex halimus, Haloxylon scoparium, Suaeda vermiculata, Lycium europaeum, Ziziphus lotus, Rhamnus lycioides, Anabasis articulate, Peganum harmala, Pituranthos tortuousus and Thymus capitatus are distributed.

Table 1. The distribution of perennial plant species according to the different stands in the study area

	Plant species	Stand I	Stand II	Stand III	Stand IV	Stand V	Stand VI
1.	Sarcopoterium spinosum	+	+	+	+	+	-
2.	Asphodelus ramosus	+	+	+	+	+	-
3.	Juniperus phoenicea	+	+	+	+	+	-
4.	Phlomis floccose	+	+	+	-	+	-
5.	Pistacia lentiscus	+	+	+	-	-	-
6.	Rhamnus lycioides	+	+	-	+	-	+
7.	Ziziphus lotus	+	-	-	-	+	+
8.	Olea europaea	+	-	-	-	-	-
9.	Thymus capitatus	-	+	-	+	+	+
10.	Capparis spinosa	-	+	-	-	-	-
11.	Haloxylon scoparium	-	-	-	-	+	+
12.	Suaeda vermiculata	-	-	-	-	+	+
13.	Pituranthos tortuousus	-	-	-	-	+	-
14.	Atriplex halimus	-	-	-	-	-	+
15.	Lycium europaeum	-	-	-	-	-	+
16.	Anabasis articulata	-	-	-	-	-	+
17.	Peganum harmala	-	-	-	-	-	+

Table 2. The order of the families on the study area compared with flora of Libya

	Families in Flora of Libya	No. of species in Flora of Libya
1.	Asteraceae	240
2.	Poaceae	228
3.	Fabaceae	200
4.	Brassicaceae	100
5.	Apiaceae	75
6.	Caryophyllaceae	65
7.	Lamiaceae	62
8.	Chenopodiaceae	55
9.	Boraginaceae	53
10.	Liliaceae	42

	Families in The study area	No. of species in The study area
1.	Asteraceae	31
2.	Fabaceae	24
3.	Poaceae	18
4.	Brassicaceae	12
5.	Chenopodiaceae	9
6.	Lamiaceae	8
7.	Geranaceae	8
8.	Liliaceae	7
9.	Ranunculaceae	6
10.	Apiaceae	4

Table 3. Endemic species in the study area

	Species	Family	Coordinates & Elevation
1.	Anthemis cyrenaica Cosson.	Asteraceae	32:25 N & 020:52 E elevation 402 m. 32:22 N & 020:55 E elevation 509 m. 32:18 N & 020:54 E elevation 515 m.
2.	Crepis seneciodes Delile.		
3.	Romulea cyrenica Boguiot.	Iridaceae	32:25 N & 020:52 E elevation 402 m. 32:22 N & 020:55 E elevation 509 m. 32:18 N & 020:54 E elevation 515 m. 32:18 N & 020:58 E elevation 652 m.
4.	Scobiosa libyca Alvi.	Dipsacaceae	32:25 N & 020:52 E elevation 402 m. 32:22 N & 020:55 E elevation 509 m. 32:18 N & 020:54 E elevation 515 m. 32:18 N & 020:58 E elevation 652 m.
5.	Sedum bracteatum Viv.	Crassulaceae	32:25 N & 020:52 E elevation 402 m.
6.	Teucrium davaeanum Cosson.	Lamiaceae	32:25 N & 020:52 E elevation 402 m. 32:22 N & 020:55 E elevation 509 m.

In addition to environmental conditions, human activities in the study area have a significant negative impact on the natural vegetation. The most important among them was tillage for dry or irrigated farming, as well as grazing and firewood collection, where the vegetation cover in EL-Jabal EL-Akhdar was the only natural resource associated to the existence of the population through the ages. Asteraceae was the most widespread family in the study area by 16.4%, Fabaceae 12.7%, Poaceae 9.5%, Brassicaceae 6.3%, then Chenopodiaceae by 4.8% while the rest of the families formed 50.3%, and this is consistent with the results of previous studies of Asker (1998); AL-Hamedi (1999); AL-Juhary (2002) and Abdul Khaliq (2007). In order of families and in terms of number of species it is also Asteraceae, Fabaceae and then Poaceae. Compared with the first ten families of flora of Libya, it was found that Asteraceae is the largest family in the study area and in Flora of Libya as well, followed by Fabaceae which formed the second in the study area while it

was the third in flora of Libya, then Poaceae comes in third in the study area and second in flora of Libya (Table, 2).

The area is characterized by the presence of 6 endemic species (table 3) belonging to 5 families, which represent 6% of the endemic species in Libya, and about 10.7% of the endemic species in EL-Jabal EL-Akhadar area. Gymnosperms through the study area are represented only by one family and one species (Juniperus phoenicea). Angiosperms are represented by 46 families, Dicotyledons consist of 41 families which belong to 112 genera and 159 species, Monoctyledons consist of 5 families which belong to 21 genera and 29 species (Table, 4).

Table 4. Plant groups in the study area

Plant group		No. of species	No. of genera	No. of families
1.	Gymnosperms	1	1	1
2.	Dicotyledons	159	112	41
3.	Monoctyledons	29	21	5
4.	Total	189	134	47

The plant species that have been collected from the study area in the list of families, according to the classification of Angler, are arranged as follows:

FLORIST LIST

I. GYMNOSPERMS

No.	Family	Species
1.	Cupressaceae	Juniperus phoenicea L.

II. ANGIOSPERMS

No.	Family	Species
A. Dicotyledone		
2.	Urtiaceaea	Uritica dioica L.
3.		Uritica urens L.
4.	Polygonaceae	Rumex bucephalophorus L.
5.		Rumex simpliciflorus marb.
6.	Aizoaceae	Mesembryanthemum nodiflorum L.
7.	Caryophyllaceae	Silene apetala willd
8.	Illecebraceae	Paronychia arabica (Linn) DC
9.		Paronychia argentea Laimk
10.		Pteranthus dichotomus
11.	Chenopodiaceae	Anabasis articulata (forsk) mog.
12.		Arthrocnemum macrostachyum (moric.) moris.
13.		Atriplex halimus L.
14.		Chenolea arabica Boiss.
15.		Chenopodium murale L.
16.		Haloxylon scoparium (pomel.) Iljin.
17.		Suaeda pruinosa Lange.
18.		Suaeda vera forsk.
19.		Suaeda vermiculata forsk. ex Gmel.
20.	Ranunculaceae	Adonis austvalis L.
21.		Adonis microcarpa DC.
22.		Rananculus asiaticus L.
23.		Rananclus bullatus L.
24.		Rananculus muricatus L.
25.		Ranunculus paluodosus porit.
26.	Papaveraceae	Papaver hybriduml L.
27.		Papaver rhoeas L.
28.	Fumariaceaa	Fumaria dnsiflora DC.
29.	Capparaceae	Capparis spinosa L. sub sp orientalis (Duh.) Jafri.
30.	Brassicaceae	Alyssum minus (L) Rothm
31.		Biscutella didyma L
32.		Eruca sativa mill
33.		Erucaria microcarpa Boiss
34.		Hussonia pinnata (viv) Jafri
35.		Matthiola tricuspidata (L.) R.Br.
36.		Moricandia arvensis (L.) DC.
37.		Neslia apiculata fisch.
38.		Rapistrum rugosum (L) All
39.		Sinapis alba L
40.		Sinapis flexuosa poirt
41.		Sinapis Pubescens L
42.	Resedaceae	Caylusea hexagyna (forsk) ML.
43.		Reseda alba L.
44.	Crassulaceae	Sedum album L.
45.		Sedum bracteatum viv
46.		Umbilicus horizontalis (Guss) Dc
47.		Umbilicus rupestris (Salisb) Dandy
48.	Rosaceae	Sarcopoterium spinosum (L) spach
49.	Fabaceae	Anthyllis tetraphylla L.
50.		Hymenocarpos circinatus (L) savi
51.		Lathyrus aphaca L.
52.		Lotus corniculatus L.
53.		Loutus edulis L.
54.		Onobrychis crista - gall (L.) Lam.
55.		Ononis hispida Desf
56.		Ononis ntrix L
57.		Medicago coronata (L) Bart.
58.		Medicago litoralis Rohde ex Lois.
59.		Medicago marina L.
60.		Medicago Sativa L
61.		Medicago tornata (L) Mill
62.		Mediacago turbinata (L.) All.
63.		Tetragonolbus burpureus monch.
64.		Triofolium arvense L.
65.		Trifolium campestre schreb.
66.		Trifolium Pupureum Lios.
67.		Trifolium scabrum L.
68.		Trifolinm stellatum L.
69.		Trifolium subterraneum L.
70.		Trifolium tomentosum L.
71.		Vicia lutea L.
72.		Vicia Monantha Retz.
73.	Oxalidaceae	Oxalis articulata savig.
74.	Geraniaceae	Erodium arborescens (Desf.) Willd.
75.		Erodium cicutarium (L) L. Herit.
76.		Erodium glaucophllum (L.) L. Herit.
77.		Erodium gruinum (L) L. Herit.
78.		Erodium malacoides (L.) L Herit.
79.		Geranum brutium Gasp.
80.		Geranum molle L.
81.		Geranum rotundifolium L.

No.	Family	Species
A. Dicotyledone		
82.	Zygophyllaceae	Peganum harmala L.
83.	Linaceae	Linum bienne Mill.
84.	Euphorbiaceae	Euphorbia heloscopia L.
85.		Euphorbia peplus L.
86.		Mercurialis annua L.
87.	Anacardiaceae	Pistacia lentiscus L.
88.	Rhamnaceae	Rhamnus lycioides L.
89.		Ziziphus lotus (L.) Lam.
90.	Malvaceae	Malva aegyptia L.
91.		Malva sylvestris L.
92.	Cistaceae	Fumana arabic (L.) Spach
93.	Cucurbitaceae	Bryonia cretica L.
94.	Theigonaceae	Theligonum cynocrambe L.
95.	Apiaceae	Malabaila suaveolens (Dcl.) Coss.
96.		Pituranthos tortuosus (Desf) Benth.
97.		Scandix australis L.
98.		Smyrnium olusatrum L.
99.	Primulaceae	Anagullis arvensis L.
100.	Plumbaginaceae	Limonium thouinii (Viv.) O. Ktze.
101.		Limonium tubiflorum (Del.) O. Ktze.
102.	Oleaceae	Olea europaea L.
103.	Rubiaceae	Callipeltis cucullaris (L) Stev.
104.		Galium cossonianum Jafri.
105.		Galium setaceum Lam.
106.		Sherardia arvensis L.
107.	Convlvulaceae	Convolvlus althaeoides L.
108.		Convolvulus humilus Jaeq.
109.		Convolvlus oleifolus Desr.
110.	Boraginaceae	Echium angustifolium mill.
111.		Echium humile Desf.
112.	Lamiaceae	Lamium amplexicaula L.
113.		Micromereria Juliana (L.) Bent ex Rechenb.
114.		Nepeta Scordtis L.
115.		Phlomis floccosa D. Don.
116.		Prasium majus L.
117.		Salvia verbenace L.
118.		Teucrium davaeanum coss.
119.		Thymus Capitatus (L) Hoffm & Link.
120.	Solanaceae	Lycium europaeum L.
121.	Scrophulariaceae	Anarrhinum fruticosum Deaf.
122.	Orobancaceae	Cistanche phelypaea (L.) Couto.
123.	Plantaginaceae	Plantago albicans L.
124.		Plantago lagopus L.
125.		Plantago ovata forskal.
126.	Valerianaceae	Feddia caput-bovis pomel.
127.		Valerianella disco idea (L.) Loisel.
128.	Dipsacaeae	Scobiosa arenaria forskal.
129.		Scabiosa libyca Alavi.
130.	Asteraceae	Acillea santolina L.
131.		Anthemis cyrenica cosson.
132.		Anthemis secundirmea Biv.
133.		Artemisia herb-alba Asso.
134.		Atractylis cancellata L.
135.		Atractylic serratuloides sieb ex cass.
136.		Carduus getulus Pomel.
137.		Calendula arvensis L.

No.	Family	Species
A. Dicotyledone		
138.	Asteraceae	Carlin a sicula Ten.
139.		Centaurea alexandrina Delile.
140.		Centaurea africana Lam.
141.		Chrysanthemum carina tum schousbea.
142.		Chrysanthemum coronarium L.
143.		Cichorium pumilum Jacq.
144.		Crepis senecioides Delle.
145.		Cynara cornigera Lindley.
146.		Echinops galalenis Schwein.
147.		Evax contracta Boiss.
148.		Helichrysum stoechas (L.) Monch.
149.		Hypochoeris achyrophorus L.
150.		Hypochoeris glabra L.
151.		Launaea capitata (spreigel) Dandy.
152.		Launaea nudicaulis (L) Hooker.
153.		Leontdon simplex (viv) wider.
154.		Leontodn tubersosus L.
155.		Notobasis syriaca L.
156.		Onopordum espinae Cosson ex Bonnet.
157.		Pallenis spinosa (L.) Cass.
158.		Phagnalou rupestre (L.) DC.
159.		Reichardia tingitana (L.) Roth.
160.		senecio gallicus Chiaxc.
B. Monocotyledons		
161.	Alliaceae	Allhum roseum L.
162.	Liliaceae	Asparagus aphyllus L.
163.		Asparagus stipularis Forsk.
164.		Ashodelus fistulosus L.
165.		Asphodelus ramosus Salzm.
166.		Bellvalia mauritanica Pomel.
167.		Dipcadia serotinum (L.) Medic.
168.		Urginea maritima (L.) Baker.
169.	lridaceae	Iris sisyrinchium L.
170.		Romulea cyrenaica Beguinot.
171.	Poaceae	Ammophila austalis (Mbille.) Port et Rigo
172.		Avellinia micheli (Savi.) Pari.
173.		Avena barbata Pott ex Link.
174.		Avena sterilis L.
175.		Briza maxima L.
176.		Briza minor L.
177.		Bromus dandrus Roth.
178.		Bromus rigidus Roth.
179.		Cynosurus elegans Desf.
180.		Desmazeria lorentii HScholz.
181.		Hainardia cylindrica (Willd.) Greuter.
182.		Hordeum marinum Huds.
183.		Hordeum murinum L.
184.		Hordeum spontanum C. Kock.
185.		Hordeum vulgare L.
186.		Lolium loliaceum (Bory et Chaub.) Hand-Mazz.
187.		Phalaris minor Retza.
188.		Trisetaria macrochaeta (Boiss.) Mair.
189.	Araceae	Arisarum vulgare Targ. Tozz.

❖ BIOLOGICAL SPECTRUM

From the results it was found that Annuals in the study area were the majority. This shows the effect of the stressful climatic conditions (strong winds, high temperatures, high rates of evaporation and scanty, irregular and low rainfall) especially in the southern part of the study area, links the short life cycle of these species which was confirmed by Cain (1950) who emphasized that weather conditions directly affect the life form. Second come Chamephytes, then Cryptophytes and finally

Phanerophytes. The dominance of Annuals is due to the long dry period during the year in this region. This is consistent with what was stated by Whittaker (1950) that Annuals prevail in the dry areas, and this is also the reason for the lack of Phanerophytes as the only plant in the study area that does not depend on breeding and production of new types for survive as much as it depends on longevity because of the drought conditions. Biological spectrum in the study area was divided into four different forms as follows:

1. PHANEROPHYTES:

Consisted of 6 species representing 3.2% of species that were collected from the study area. These plants are trees and shrubs such as Juniperus phoenicea, Pasticia lentiscus and Rhamnus lycioides.

2. CHAMEPHYTES:

Consisted of 52 species representing 27.5% of collected species, characterized by semi-wooden or wooden plants and mostly erect, such as Thymus capitatus, Haloxylon scoparium and Capparis spinosa.

3. CRYPTOPHYTES:

Consisted of 19 species representing 10.1% of collected species characterized by species that grow under the surface of the earth, such as Asphodelus ramosus, Ranunculs bullatus and Urgina maritima.

4. THEROPHYTES:

This was the largest group and consisted of 112 species representing 59.2% of the collected species, such as Brizza maxima, Medicago marina and Reseda alba.

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