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Plant diveristy of Al-Khoms – Misrata Province in Libya

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ABSTRACT

The present parer concernes mainly with the plant species diversity of Al-Khoms - Misrata province. The survey of plant species of such area was taken in between 2018-2020. A total number of 375 different plants have been collected representing 62 families, 241 genera, and 375 species, of which 51 families and 307 species are belonging to dicotyledons, 8 families and 65 species belonging to monocotyledons, and 3 families belong to Gymnosperms each represented by only one species. The results of this study showed that the dominance of the family Asteraceae with 65 species, followed by the family Fabaceae with 48 species, the family Poaceae with 41 species, the family Brassicaceae with 20 species, the family Chenopodiaceae with 17 species, the family Liliaceae with 14 species, and the family Lamiaceae with 13 species. Other families are represented by 7 species or less. The present results have also shown that the dominance of the genera *Plantago* with 9 species, followed by *Ononis* and *Astragalus* with 7 species each. Analysis of lifeform spectrum have indicated that the predominance of therophytes with 218 species, followed by Hemicryptophytes with 61 species. However, chorotype spectrum analysis have shown that the dominance of Mediterranian with 164 species, followed by Mediterrean/Iranu-Turanean with 80 species.

Keywords: Plant diversity; flora; Al-Khoms; Misrata.

1. Introduction

The present study deals with the flora and plant diversity of Al-Khoms - Misrata province which are located about 120 -250 Km. east of Tripoli respectively. Libya is a North African country that lies between 18° 33' N. latitude & 9° 25' E longitude (Figure 1), and occupies an area of about 1, 759, 540 square kilometres [1], about 90% or more of which is deserted, except the coastal strip, Al Jabal El-Akhdar, and Jabal Nafousa regions [2], [3] indicated that the coastal belt extends from the Tunisian to the Egyptian borders is about 5.2% of the whole country. The costal belt is quite fertile area that receives an adequate amount of rainfall in winter,

particularly in the east and west, thus a great part of this belt exhibits the typical Mediterranean flora. The climate of the studied area is typical of the Mediterranean, characterized by the cool, rainy winter and a hot dry summer. Whereas, the climate over most of the country is hot, arid-semiarid Sahara, but it is moderated along the coastal littoral by the Mediterranean Sea [4]. The Libyan vascular flora consists of 2113 species belonging to 864 genera and 161 families, of which 2088 species, 844 genera, and 145 familes are angiosperms, 15 species, 8 genera, and 6 families are gymnosperms, and 15 species, 12 genera and 10 families are pteridophytes [5]. The distribution of Libyan seed plant species was

characterized by a high number of herbs (Annual to perennial), and low number of woods (tree and shrub); such distribution has an important influence on the structure of floral composition. The geographic element of the flora was predominantly Tropical and Mediterranean [6]. The floristic composition of plants in Libya is still relatively unknown regading ecological and botanical studies [7].

The history of plant exploration in Libya has been done by several authors; the most important comprehensive floristic studies in Libya were in the form of a checklist of the flora of Libya by Keith [8], and Flora of Libya by Jafri and El-Ghadi [9]. Since the flora of Al-Khoms - Misrata district has not been studied thoroughly during the work on the flora of Libya (1976-1990) exept for the study on the flora of selected rgions of Misrata by Al-Dennaa and Buhadra [10]. Therefore, the main purpose of this survey is to have an exclusive study to the flora, and plant diversity of Al-Khoms - Misrata region.

1.1. Study area

This paper deals mainly with the flora, and plant diversity of Al-Khoms - Misrata district. Such region is located about 120 km., and 250 Km. east of Tripoli (Capital) respectively, and lies in between (15◦ 14' 46.55" N, & 39◦ 32' 43.33" E, and 06◦ 15' 18.29" N, 19◦ 32' 57.35"E). The studied region ranges between 100-500 m above the see level as measured by GPS. Al-Khoms - Misrata district is bounded by the sea to the north, Gasr Al-Akhiar to the west, Tawergha to the east, and Al-Krarim to the south (Figures 1&2). The climate of Al-Khoms - Misrata followes the climate of the Mediterranean region, which is cold & rainy at the winter with an averge rainfall, ranges between 100-300 mm annually, and hot - dry at the summer with a mean of 18°C [5]. Climate is one of the most important factors affecting biodiversity, vegetation distribution, and soil composition, while, and the high temperature affects vegetation and the dominant species [11].

Fig.1. Map of Libya showing the study area.

Fig. 2. Showing location of the study area.

2. Methods

A total number of 375 different plant specimens were collected by the authers in between 2018-2020 upon various field trips about one trip per month. The collected plants were then treated by the usual herbarium procedures including pressing, poisoning, mounting, labeling, and identifying. Identification of plants was done by the authors, using the following litheratures [8, 9. 12]. Eventually, the identified plant specimens were deposited at the national herbarium, Botany Department, Faculty of Sciences, University of Tripoli.

3. Results

By the end of the survey, a total number of 375 different plant taxa belonging to 62 families, such number of species includes three different plant groups, these are gymnosperms with three families with one species each, dicotyledons with 51 families and 307 species, and monocotyledons with 8 families and 65 species (Table 1). The families Asteraceae, Fabaceae, Poaceae, and Brassicaceae, are considered as the most dominant and sizable families with 65, 48, 41, and 20 plant species respectively. Other families such as Chenopodiaceae, Liliaceae and Lamiaceae are less dominant and represented by 17, 14 & 13 species respectively (Table 2). Whereas, the rest of the families are represented by 7 species or less.

Table 1. Shows the three groups of plants included in this

Group	No.of Families	Species
Gymnospermis	3	3
Dicotyledons	51	307
Monocotyledons	8	65

Table 2. Shows the dominant families.

Family	No. of species	%
Asteraceae	65	17.3
Fabaceae	48	12.8
Poaceae	41	10.9
Brassicaceae	20	5.3
Cheopodiaceae	17	4.5
Liliaceae	14	3.7
Lamiaceae	13	3.4

The most dominant genera are plantago with 9 species, followed by Ononis and Astragalus with 7 species each, whereas, genera such as *Medicago*, *Erodium*, and *Euphorbia* are represented by 6 species each, while Centaurea represented by 5 species, and *Silene*, *Helianthemum*, *Cheopodium*, *Bromus, and Asphodellus* represented by 4 species each. Other genera represented by 2-3 species or less (Table 3).

Table 3. Shows the dominant genera.

Genus	No. of species
Plantago	9
Ononis	7
Astragaluas	7
Medicago	6
Euphorbia	6
Erodium	6
Centaurea	5
Silene	4
Helianthemum	4
Cheopodium	4
Bromus	4
Asphodellus	4

The analysis of life form spectrurm of the species based on Raunkiae system [13] as modified by Govaerts et al. [14]. The results of analysis showed the absolute dominance of Therophytes with 218 species, followed by Hemicryptophytes with 61 species, Chaemephytes with 38, and Geophytes with 37 species. The other life forms were less frequent, for example, Nanophanerophytes with 16 species, and Phanerophytes with 5 species (Table 4).

Table 4. Shows lifeforms

Lifeform	No of species	%
Therophytes	218	58.1
Hemicryptophtes	61	16.3
Chaemephytes	38	10.1
Geophytes	37	9.9
Nanophanerophytes	16	4.3
Phanerophytes	5	1.3

Chorological spectrum of collected and identified plant species were analyzed as well, and the results showed an absolute predominance of Mediterranean plants with 165 species, followed by Med./ Ir-Tu. species with 80 species, whereas, the other chorological spectra were with little frequent as appered in (Tables 5,6).

Table 5. Shows chorotypes.

Chorotype	No. of species	%
Med	165	44.0
Med./ Ir-Tu.	80	21.3
Med. / Ir-Tu./ Eur-Si.	27	7.2
Sah-Ar.	22	5.9
Plu	20	5.3
Med. / Eur-Si.	13	3.5
Med./ Sah-Ar.	7	1.9
Cos	5	1.3
Med./ Ir-Tu./ Sah-Ar.	5	1.3
Ir-Tu./ Sah-Ar.	4	1.06
Trop	4	1.06
Sah-Ar. / Sud.	4	1.06
Med. / Ir-Tu./ Sud.	3	0.8
Sud.	3	0.8
Ir-Tu	2	0.5
Eur-Si.	2	0.5
Med./ Eru-Si./ Sah-Ar.	2	0.5
Med. / Sud.	2	0.5
Americas	1	0.3
Australia	1	0.3
Med./ Canaries.	1	0.3
Med./ Ir-Tu./ Trop.	1	0.3
Sah-Ar./ Sud./ Ir-Tu.	1	0.3
Sud./ Sah-Ar.	1	0.3

The dominance of familes Asteraceae, Fabaceae, and Poaceae were expected since such families are dominated the Mediterranean climate conditions. In addition to that, the families are cosmopolitan in distribution and the dominance of Therophytes and Mediterranean chorotypes agreed with our expectations as well because the investigated area is fall within the coastal Mediterranean region in which the

Mediterranean Therophytes are dominating. Moreover, the results have revealed that the most characteristic features of the flora of Al-Khoms-Misrata are the large number of families, which is close to the half number of the total number of families included in the flora of Libya, and this result indicates that the flora and plant diversity of Al-Khoms-Misrata is rich.

Table 6. Shows recorded species with lifeforms and chorotypes.

No.	Family	Species	Lifeform	Chorotype
		Gymnosperms		
1	Cupressaceae	*Juniperus oxyderus* L.	Ph	Med.
2	**Ephedraceae**	*Ephedra altissima* **Desf.**	**NP**	**Med.**
3	Pinaceae	*Pinus halipensis* L.	Ph	Med.
		Monocots		
4	Alliaceae	*Allium ampeloprasum* L.	Geo	Med.
5	**Alliaceae**	***Allium negrianum* Maire & Weiller**	**Geo**	**Med.**
6	Alliaceae	*Allium roseum* L.	Geo	Med.
7	**Amaryllidaceae**	***Pancartium maritimum* L.**	**Geo**	**Med.**
8	Araceae	*Arisarum vulgare* Targ. Tozz	Geo	Med.
9	**Cyperaceae**	***Cyperus kali* (Forsk.) Murb.**	**Geo**	**Med./ Canaries.**
10	Cyperaceae	*Scirpus holoschoenus* L.	Geo	Med./ Ir-Tu.
11	**Iridaceae**	***Colchicum retchii* R. BR.**	**Geo**	**Med.**
12	Iridaceae	*Iris sisyrinchium* L.	Geo	Med.
13	**Jucaceae**	***Jucus acutus* L.**	**Geo**	**Med./ Ir-Tu.**
14	Liliaceae	*Androcymbium gramineum* (Cav.) Mc Brid	Geo	Med.
15	**Liliaceae**	***Asparagus aphyllus* L.**	**Geo**	**Med.**
16	Liliaceae	*Asparagus stipularis* Forsk.	Geo	Med.
17	**Liliaceae**	***Asphodelus aestivus* Brot.**	**Geo**	**Med.**
18	Liliaceae	*Asphodelus fistulosus* L.	Geo	Med.
19	**Liliaceae**	***Asphodelus microcarpus* Salzm. & Viv.**	**Geo**	**Med.**
20	Liliaceae	*Asphodelus tenuifolius* Cav.	Geo.	Med./ Ir-Tu.
21	**Liliaceae**	***Bellevalia sessiliflora* (Viv.) Kunth**	**Geo**	**Med.**
22	Liliaceae	*Dipcadi serotinum* (L.) Medic.	Geo	Plu.
23	**Liliaceae**	***Muscari comosum* (L.) Mill.**	**Geo**	**Med.**
24	Liliaceae	*Muscari racemosum* (L.) Mill.	Geo	Med.
25	**Liliaceae**	***Scilla peruviana* L.**	**Geo**	**Med.**
26	Liliaceae	*Urginea autumnalis* L.	Geo	Med.
27	**Liliaceae**	***Urginea maritima* (L.) Baker**	**Geo**	**Med.**
28	Poaceae	*Aegilops Kotschyi* Boiss.	Th	Med./ Ir-Tu.
29	**Poaceae**	***Avellinia mitchelii* (Savi) Par1.**	**Th**	**Med.**
30	Poaceae	*Avena barbata* Pott. ex Link.	Th	Med./ Ir-Tu.
31	**Poaceae**	***Avena sterilis* L.**	**Th**	**Med./ Ir-Tu.**
32	Poaceae	*Bromus diandrus* Roth.	Th	Med.
33	**Poaceae**	***Bromus madritensis* L.**	**Th**	**Plu.**
34	Poaceae	*Bromus rigidus* Roth.	Th	Med./ Eur-Si
35	**Poaceae**	***Bromus rubens* L.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
36	Poaceae	*Cenchrus ciliaris* L.	Th	Sah-Ar.
37	**Poaceae**	***Crithopsis delileana* (Schultes) Rozhev.**	**Th**	**Med./ Ir-Tu.**
38	Poaceae	*Cutandia maririma* (L.) Barbey	Th	Med.
39	**Poaceae**	***Cutandia memphitica* (Spreng.) Richter.**	**Th**	**Med./ Ir-Tu.**
40	Poaceae	*Cynodon dactylon* (L.) Pers.	Geo	Boreal. Trop.
41	**Poaceae**	***Dactyloctenium aeygyptium* (L.) P. Beauv.**	**Th**	**Trop.**
42	Poaceae	*Hordeum murinum* L.	Th	Plu.
43	**Poaceae**	***Hyparrhenia hirta* (L.) Stapf**	**H**	**Plu.**

44	Poaceae	*Imperata cylindrica* (L.) Reauschel.	Geo	Med./ Ir-Tu.
45	**Poaceae**	***Lagurus ovatus* L.**	**Th**	**Plu.**
46	Poaceae	*Lamarckia aurea* (L.) Moench	Th	Med./ Ir-Tu./ Sud
47	**Poaceae**	***Lolium loliaceum* Bory & Chaub.**	**Th**	**Med./ Ir-Tu.**
48	Poaceae	*Lolium rigidum* Gaud.	Th	Plu.
49	**Poaceae**	***Lolium perenne* L.**	**H**	**Med./ Ir-Tu./ Eur-Si.**
50	Poaceae	*Lophochloa rohlfsii* (Asch.) H. Scholz.	Th	Sah-Ar.
51	**Poaceae**	***Lophochloa salzmannii* Boiss &H.scholz**	**Th**	**Med.**
52	Poaceae	*Lygeum spartum* Loefl. ex L.	Geo	Med.
53	**Poaceae**	***Parapholis incurva* (L.) C.E. Hubbard**	**Th**	**Med./ Ir-Tu./ Eur-Si**
54	Poaceae	*Pennisetum setaceum* (Forsk.) Chiov.	Geo	Med./ Ir-Tu./ Sud.
55	**Poaceae**	***Phragmites australis* (Cav.) Trin. ex steud.**	**Geo**	**Cos.**
56	Poaceae	*Piptatherum miliaceum* (L.) Coss.	H	Med.
57	**Poaceae**	***Poa annua* L.**	**Th**	**Plu.**
58	Poaceae	*Polypogon monspeliensis* (L) Desf.	Th	Plu.
59	**Poaceae**	***Psilurus incurvus Gouan.***	**Th**	**Med./ Ir-Tu.**
60	Poaceae	*Schismus barbatus* (L.) Thell.	Th	Med./ Ir-Tu.
61	**Poaceae**	***Setaria adherens* (Forsk.) Chiov.**	**Th**	**Plu.**
62	Poaceae	*Sorghum halepense* (L.) Pers.	Geo	Trop.
63	**Poaceae**	***Stipa barbata* Desf.**	**Geo**	**Med./ Ir-Tu.**
64	Poaceae	*Stipa capensis* Thunb.	Th	Med./ Ir-Tu./ Sah-Ar.
65	**Poaceae**	***Stipa tenacissima* L.**	**Geo**	**Med.**
66	Poaceae	Stipagrostis ciliata (Desf.) de winter.	H	Sah-Ar.
67	**Poaceae**	***Stipagrostis pugens* (Desf.) de winter.**	**Geo**	**Sah-Ar.**
68	Poaceae	*Trachynia distachya* (L.) Link.	Th	Med./ Ir-Tu.
		Dicots		
69	Aizoaceae	*Aizoon hispanicum* L.	Th	Med./ Ir-Tu./ Eur-Si.
70	**Aizoaceae**	***Carboprotus edulis* (L.) N.E.**	**H**	**Plu.**
71	Aizoaceae	*Mesembryathemum crystallium* L.	Th	Med./ Eru-Si./ Sah-Ar.
72	**Amaranthaceae**	***Amaranthus viridis* L.**	**Th**	**Trop.**
73	Anacardiaceae	*Pistacia lentiscus* L.	NP	Med./ Ir-Tu.
74	**Anacardiaceae**	***Rhus tripartita* (Ucria.) Grande.**	**NP**	**Med.**
75	Apiaceae	*Anethum graveolens* L.	Th	Med./ Ir-Tu.
76	**Apiaceae**	***Bunium fontainesii* (Pers.) Maire.**	**Geo**	**Med.**
77	Apiaceae	*Bupleurum semicopositum* L.	Th	Med./ Ir-Tu.
78	**Apiaceae**	***Daucus syrticus* Murb.**	**Th**	**Med.**
79	Apiaceae	*Eryncium maritimum* L.	H	Med.
80	**Apiaceae**	***Pituranthos tortuousus* (Desf.) Benth & Hok.**	**Ch**	**Med.**
81	Apiaceae	*Torilis nodosa* (L.) Gaertn.	Th	Med./ Ir-Tu./ Eur-Si.
82	**Asclepiadaceae**	***Calotropis procera* (Ait.) Ait.**	**NP**	**Sud./ Sah-Ar.**
83	Asclepiadaceae	*Periploca angustifolia* Labill .	NP	Med.
84	**Asteraceae**	***Amberboa leucantha* Cosson ex Batt.**	**Th**	**Sah-Ar.**
85	Asteraceae	*Amberboa libyca* (Viv.)Alavi	Th	Med.
86	**Asteraceae**	***Amberboa tubiflora* Murb.**	**Th**	**Med.**
87	Asteraceae	*Anacyclus monanthos* (L.) Thell.	Th	Med.
88	**Asteraceae**	***Andryala integrifolia* L.**	**Th**	**Med.**
89	Asteraceae	*Anthemis secundiramea* Biv.	Th	Med.
90	**Asteraceae**	***Anvillea garcinii* (Burm. fil.) DC.**	**Th**	**Med./ Ir-Tu.**
91	Asteraceae	*Artemisia campestris* L.	H	Med./ Ir-Tu.
92	**Asteraceae**	***Artemisia herba-alba* Asso.**	**H**	**Med./ Sah-Ar.**
93	Asteraceae	*Asteriscus pygmaeus* DC.	Th	Ir-Tu./ Sah-Ar.
94	**Asteraceae**	***Atractylis cancellata* L.**	**Th**	**Med.**
95	Asteraceae	*Atractylis deliculata* Batt ex Chevall,	Th	Sah-Ar.
96	**Asteraceae**	***Atractylis serrata* Pomel**	**Th**	**Med.**
97	Asteraceae	*Atractylis serratuloides* Sieb. ex Cass.	H	Sah-Ar.
98	**Asteraceae**	***Calendula arvensis* L.**	**Th**	**Med./ Ir-Tu.**
99	Asteraceae	*Carducellus eriocephalus* Boiss.	H	Med.

100	**Asteraceae**	***Carduus argentatus* Durieu in Duchartre.**	**Th**	**Med.**
101	Asteraceae	*Carduus getulus* Pomel	Th	Sah-Ar
102	**Asteraceae**	***Carthamus lanatus* L.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
103	Asteraceae	*Centaurea alexandrina* Delile	Th	Med.
104	**Asteraceae**	***Centaurea dimorpha* Viv.**	**H**	**Med./ Ir-Tu.**
105	Asteraceae	*Centaurea glomerata* Vahl.	Th	Med.
106	**Asteraceae**	***Centaurea maroccana* Ball.**	**Th**	**Med.**
107	Asteraceae	*Centaurea sphaerocephala* L.	H	Med.
108	**Asteraceae**	***Chamomilla recutita* Rausch.**	**Th**	**Eur-Si.**
109	Asteraceae	*Chrysanthemum coronarium* L.	Th	Med.
110	**Asteraceae**	***Conyza aegyptiaca* (L.) Dryader.**	**Th**	**Med.**
111	Asteraceae	*Conyza bonariensis* L.	Th	Med.
112	**Asteraceae**	***Conyza canadensis* L**	**Th**	**Cos.**
113	Asteraceae	*Crepis vesicaria* L.	H	Med./ Eur-Si.
114	**Asteraceae**	***Crupina crupinastrum* (Moris) Vis.**	**Th**	**Med./ Ir-Tu.**
115	Asteraceae	*Cynara cardunculus* L.	H	Med.
116	**Asteraceae**	***Echinops galalensis* Schweinf.**	**H**	**Med.**
117	Asteraceae	*Echinops spinosissimum* Turra.	H	Med.
118	**Asteraceae**	***Filago desertorum* Pomel.**	**Th**	**Ir-Tu./ Sah-Ar.**
119	Asteraceae	*Filago pyramidata* L.	Th	Med./ Ir-Tu.
120	**Asteraceae**	***Hedypnois cretica* (L.) Dum.-Courset**	**Th**	**Med.**
121	Asteraceae	*Helichrysum stoechas* (L.)Moench	H	Med.
122	**Asteraceae**	***Hyoseris scabra L.***	**Th**	**Med.**
123	Asteraceae	*Ifloga spicata* (Forssk.) Sch.Bip.	Th	Med./ Ir-Tu.
124	**Asteraceae**	***Inula crithmoides* L.**	**Ch**	**Med./ Eur-Si./ Sah-Ar.**
125	Asteraceae	*Launaea capitata* (Sprengel) Dandy in Andrews.	H	Sah-Ar./ Sud.
126	**Asteraceae**	***Launaea nudicaulis* L.**	**H**	**Sah-Ar./ Sud./ Ir-Tu.**
127	Asteraceae	*Launaea resedifolia* (L.) O. Kuntze	H	Med.
128	**Asteraceae**	***Leontodon simplex* (Viv.) Widder**	**Th**	**Med./ Eur-Si.**
129	Asteraceae	*Leontodon tuberosus* L	H	Med.
130	**Asteraceae**	***Logfia minima* (Sm,) Dumort**	**Th**	**Eur-Si.**
131	Asteraceae	*Nolletia chrysocomides* Desf.	H	Med.
132	**Asteraceae**	***Onopordum arenarium* (Desf.) Pomel.**	**H**	**Med.**
133	Asteraceae	*Onopordum espinae* Cosson exBonnet	H	Med.
134	**Asteraceae**	***Pallenis spinosa* (L.) Cass.**	**H**	**Med./ Ir-Tu.**
135	Asteraceae	*Phagnalon rupestre* (L.) DC.	H	Med./ Ir-Tu.
136	**Asteraceae**	***Picris asplenoides* L.**	**Th**	**Sah-Ar.**
137	Asteraceae	*Reichardia tingitana* (L.)Roth	Th	Ir-Tu./ Sah-Ar.
138	**Asteraceae**	***Rhaponticum aquale* (L.) DC.**	**H**	**Med.**
139	Asteraceae	*Scorzonera undulata* Vahl	Geo	Med.
140	**Asteraceae**	***Senecio gallicus* Chiax**	**Th**	**Med.**
141	Asteraceae	*Senecio vulgaris* L.	Th	Med./ Ir-Tu./ Eur-Si
142	**Asteraceae**	***Silybum marianum* (L.) Gaertner**	**Th**	**Med./ Ir-Tu./ Eur-Si**
143	Asteraceae	*Sonchus asper* (L.) Hill	H	Med./ Ir-Tu.
144	**Asteraceae**	***Sonchus oleraceus* L.**	**Th**	**Cos.**
145	Asteraceae	*Sonchus tenerrimus* L.	Th	Med./ Ir-Tu./ Sud.
146	**Asteraceae**	***Tripleurospermum trifuscatum* (Desf.) Schultz**	**Th**	**Med.**
147	Asteraceae	*Urospermum picroides* (L.) Scop. Ex Schmidt.	Th	Med./ Ir-Tu.
148	**Asteraceae**	***Verbesina encelioides* (Cav.) Benth. & Hook.**	**Th**	**Americas**
149		*Alkanna tinctoria* (L.) Tausch ssp *tripolitana*	H	Med.
	Boraginaceae	*A. tinctoria* (L.) Tausch ssp *tinctoria*	**H**	**Med.**
150	Boraginaceae	*Echiochilon fruticosum* Desf.	Ch	Med.
151	**Boraginaceae**	***Echium angustifolium* Mill.**	**H**	**Med.**
152	Boraginaceae	*Echium plantagineum* L.	Th	Med.
153	**Boraginaceae**	***Elizaldia calycina* Roem.**	**Th**	**Med.**
154	Boraginaceae	*Heliotropium europaeum* L.	Th	Med.

155	**Boraginaceae**	**Neatostema apulum (L.) I.M. Johnst.**	**Th**	**Med.**
156	Brassicaceae	*Biscutella didyma* L.	Th	Med./ Ir-Tu.
157	**Brassicaceae**	***Brassica tournefortii* Gouan.**	**Th**	**Med./ Sah-Ar.**
158	Brassicaceae	*Cakile aegyptiaca* (L.) Willd.	Th	Med./ Eur-Si.
159	**Brassicaceae**	***Carichtera annua* (L.) DC.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
160	Brassicaceae	*Clypeola jonthlaspi* L.	Th	Med./ Ir-Tu./ Eur-Si.
161	**Brassicaceae**	***Didesmus bipinnatus* (Desf.) DC.**	**Th**	**Med.**
162	Brassicaceae	*Diplotaxis harra* (Forsk.) Boiss.	Th	Med./ Ir-Tu.
163	**Brassicaceae**	***Diplotaxis muralis* (L.) DC.**	**Th**	**Med./ Eur-Si.**
164	Brassicaceae	*Enarthrocarpus clavatus* Del. ex Godr.	Th	Med.
165	**Brassicaceae**	***Eruca sativa* Mill.**	**Th**	**Med./ Ir-Tu.**
166	Brassicaceae	*Erucaria microcarpa* Boiss.	H	Med.
167	**Brassicaceae**	***Hussonia pinnata* (Viv.) Jafri.**	**Th**	**Med./ Sah-Ar.**
168	Brassicaceae	*Lobularia libyca* (Viv.) Meisner.	Th	Med./ Ir-Tu.
169	**Brassicaceae**	***Lobularia maritima* L & Desv.**	**H**	**Med.**
170	Brassicaceae	*Mathiola fruiticosa* (L.) Maire.	H	Med./ Eur-Si.
171	**Brassicaceae**	***Matthiola longipetala* (Vent.) DC.**	**Th**	**Med./ Ir-Tu.**
172	Brassicaceae	*Matthiola parviflora* (Schousbe.) R.Br. In Ait.	Th	Sah-Ar.
173	**Brassicaceae**	***Sinapis alba* L.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
174	Brassicaceae	*Sisymbrium irio* L.	Th	Med./ Ir-Tu.
175	**Brassicaceae**	***Sisymbrium runcinatum* Lag. ex DC.**	**Th**	**Med./ Ir-Tu.**
176	Caryophyllaceae	*Silene apetala* Willd.	Th	Med./ Ir-Tu.
177	**Caryophyllaceae**	***Silene colorata* Poiret.**	**Th**	**Med.**
178	Caryophyllaceae	*Silene gallica* L	Th	Cos.
179	**Caryophyllaceae**	**Silene succulenta Forsk.**	**H**	**Med.**
180	Caryophyllaceae	*Spergula fallax* (Lowe.) Krause in Sturm.	Th	Med./ Ir-Tu.
181	**Caryophyllaceae**	***Spergularia diandra* (Guss.) Heldr. & Sart.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
182	Caryophyllaceae	*Spergularia rubra* (L.) J & C. Presl	Th	Med./ Eur-Si.
183	**Caryophyllaceae**	***Vaccharia pyramidata* Medic.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
184	Chenopodiaceae	*Anabasis articulata* (Forssk.) Moq.	Ch	Sah-Ar.
185	**Chenopodiaceae**	***Arthrocnemem macrostacyum* (Moric.) K.Koch.**	**Ch**	**Med.**
186	Chenopodiaceae	*Atriplex halimus* L.	Ch	Med.
187	**Chenopodiaceae**	***Atriplex rosea* L.**	**Th**	**Med./ Ir-Tu.**
188	Chenopodiaceae	*Atriplex stylosa* Viv.	Ch	Med.
189	**Chenopodiaceae**	***Beta vulgaris* L.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
190	Chenopodiaceae	*Blackiella inflata* (F. Muell.) Aellen in Engler.	Th	Australian
191	**Chenopodiaceae**	***Chenopodium album* L.**	**Th**	**Plu.**
192	Chenopodiaceae	*Chenopodium foliosum* (Moench.) Aschers.	Th	Med./ Ir-Tu./ Eur-Si.
193	**Chenopodiaceae**	***Chenopodium murale* L.**	**Th**	**Plu.**
194	Chenopodiaceae	*Chenopodium vulvaria* L.	Th	Med./ Eur-Si.
195	**Chenopodiaceae**	***Halimione portulacoides* (L.) Allen.**	**H**	**Plu.**
196	Chenopodiaceae	*Hammada scoparia* (Pomel) IIjin.	Ch	Med./ Ir-Tu./ Sah-Ar.
197	**Chenopodiaceae**	***Kochia indica* Wight.**	**Th**	**Med./ Ir-Tu.**
198	Chenopodiaceae	*Salsola kali* L.	Th	Plu.
199	**Chenopodiaceae**	***Suaeda vera* Forsk. ex Gmel.**	**Ch**	**Med./ Sah-Ar.**
200	Chenopodiaceae	*Suaeda vermiculata* Forsk. ex Gmel.	Ch	Sah-Ar./ Sud.
201	**Cistaceae**	***Cistus parviflorus* Lam.**	**Ch**	**Med.**
202	Cistaceae	*Cistus salvifolius* L.	Ch	Med.
203	**Cistaceae**	***Fumana arabica* (L.) Spach.**	**Ch**	**Med.**
204	Cistaceae	*Fumana themifolia* (L.) Spach ex Webb.	Ch	Med.
205	**Cistaceae**	***Helianthemum kahiricum Delile.***	**Ch**	**Med.**
206	Cistaceae	*Helianthemum lavandulifolium* Miller.	Ch	Med./ Eur-Si.
207	**Cistaceae**	***Helianthemum lippii* (L). Dum.**	**Ch**	**Med.**

208	Cistaceae	*Helianthemum virgatum* (Desf). Pers.	Ch	Med.
209	**Convolvulaceae**	***Convolvulus altheoides* L.**	**Th**	**Med.**
210	Convolvulaceae	*Convolvulus arvensis* L.	Geo	Plu.
211	**Convolvulaceae**	***Convolvulus supinus* Coss.**	**Th**	**Med.**
212	Coridaceae	*Coris monspeliensis* L.	Th	Med.
213	**Crassulaceae**	***Sedum sediforme* (Jacq.) Pau**	**H**	**Med.**
214	Crassulaceae	*Umbilicus horizontalis* (Guss.) DC.	H	Med.
215	**Cucurbitaceae**	***Bryonia cretica* L.**	**H**	**Med./ Ir-Tu.**
216	Cucurbitaceae	*Citrullus colocynthis* (L.) Schrad.	H	Sah-Ar.
217	**Cuscutaceae**	***Cuscuta planiflora* Ten.**	**Th**	**Med./ Ir-Tu.**
218	Dipsacaceae	*Scabiosa arenaria* Forsk.	Th	Med.
219	**Dipsacaceae**	***Scabiosa monspeliensis* Jacq.**	**Th**	**Med.**
220	Euphorbiaceae	*Chrozophora obliqua* Vahl. Juss ex Sprebgel.	Th	Med./ Ir-Tu.
221	**Euphorbiaceae**	***Euphorbia forskalii* Gay.**	**Th**	**Sud.**
222	Euphorbiaceae	*Euphorbia helioscopia* L.	Th	Plu.
223	**Euphorbiaceae**	***Euphorbia paralias* L.**	**Th**	**Med./ Eur-Si.**
224	Euphorbiaceae	*Euphorbia peplus* L.	Th	Sud.
225	**Euphorbiaceae**	***Euphorbia retusa* Forsk.**	**Th**	**Sah-Ar.**
226	Euphorbiaceae	*Euphorbia terracina* L	H	Med.
227	**Euphorbiaceae**	***Ricinus communis* L.**	**NP**	**Sud.**
228	Fabaceae	*Anthyllis tetraphylla* L.	Th	Med.
229	**Fabaceae**	***Anthyllis vulneraria* L.**	**Th**	**Med.**
230	Fabaceae	*Argyrolobium uniflorum* (Decne.) Jaub. & Spach	Ch	Med.
231	**Fabaceae**	***Astgagalus peregrinus* Vahl.**	**Th**	**Med.**
232	Fabaceae	*Astragalus boeticus* L.	Th	Med.
233	**Fabaceae**	***Astragalus hauarensis* Boiss.**	**Th**	**Med./ Ir-Tu./ Sah-Ar.**
234	Fabaceae	*Astragalus intercedens* Sam. ex Rech.f.	Th	Sah-Ar.
235	**Fabaceae**	***Astragalus sinaicus* Boiss**	**Th**	**Med./ Ir-Tu.**
236	Fabaceae	*Astragalus stella* Gouan.	Th	Med.
237	**Fabaceae**	***Astragalus tribuloides* Del.**	**Th**	**Med./ Ir-Tu.**
238	Fabaceae	*Calicotome villosa* (Poir.) Link.	NP	Med.
239	**Fabaceae**	***Coronilla scorpioides* L. & Koch.**	**Th**	**Med.**
240	Fabaceae	*Genista acanthocalda* DC.	Ch	Med.
241	**Fabaceae**	***Genista microcephala Coss. & Dur.***	**Ch**	**Med.**
242	Fabaceae	*Hedysarum spinosissimum* L.	Th	Med.
243	**Fabaceae**	***Hippocrepis bicontorta* Lois.**	**Th**	**Sah-Ar.**
244	Fabaceae	*Hippocrepis ciliata* Willd	Th	Med.
245	**Fabaceae**	***Hippocrepis multisiliquosa* L.**	**Th**	**Med.**
246	Fabaceae	*Hymenocarpos circinatus* (L.) Savi.	Th	Med./ Ir-Tu.
247	**Fabaceae**	***Lotus cytisoides* L.**	**H**	**Med.**
248	Fabaceae	*Lotus edulis* L.	Th	Med.
249	**Fabaceae**	***Lotus halophilus* Boiss.**	**Th**	**Med.**
250	Fabaceae	*Medicago laciniata* L.	Th	Sah-Ar.
251	**Fabaceae**	***Medicago littoralis* Rohde. ex Lois.**	**Th**	**Med.**
252	Fabaceae	*Medicago minima* (L.) Bart.	Th	Med./ Ir-Tu.
253	**Fabaceae**	***Medicago polymorpha* L.**	**Th**	**Med./ Ir-Tu.**
254	Fabaceae	*Medicago sativa* L.	H	Med.
255	**Fabaceae**	***Medicago tornata* (L.) Mill.**	**Th**	**Med.**
256	Fabaceae	*Melilotus indicus* (L.) All.	Th	Med.
257	**Fabaceae**	***Melilotus sulcatus* Desf.**	**Th**	**Med.**
258	Fabaceae	**Ononis angustissima** Lam.	Ch	Med.
259	**Fabaceae**	***Ononis natrix* L.**	**Ch**	**Med.**
260	Fabaceae	*Ononis serrata* Forsk.	Th	Med./ Ir-Tu.
261	**Fabaceae**	***Ononis sicula* Guss.**	**Th**	**Med./ Ir-Tu.**
262	Fabaceae	*Ononis vaginalis* Vah.	Ch	Med.
263	**Fabaceae**	***Ononis variegata* L.**	**Th**	**Med.**
264	Fabaceae	*Ononis viscosa* L.	Th	Med.
265	**Fabaceae**	***Psoralea bituminosa* L.**	**H**	**Med.**

266	Fabaceae	*Retama raetam* (Forsk.) Webb	NP	Sah-Ar.
267	**Fabaceae**	***Scorpiurs muricatus* L.**	**Th**	**Med.**
268	Fabaceae	*Scorpiurs subbvillosus* (L.) Lam	Th	Med.
269	**Fabaceae**	***Trifolium campestre* Schreb.**	**Th**	**Med.**
270	Fabaceae	*Trifolium scabrum* L.	Th	Med.
271	**Fabaceae**	***Trifolium tomentosum* L.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
272	Fabaceae	*Trigonella maritima* Delile ex Poiret.	Th	Med./ Ir-Tu.
273	**Fabaceae**	***Trigonella stellata* Forsk.**	**Th**	**Med./ Ir-Tu.**
274	Fabaceae	*Trigonella unguina* Delile.	Th	Med./ Ir-Tu.
275	**Fabaceae**	***Vicia villosa* Roth.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
276	Fumariaceae	*Fumaria gaillardotii* Boiss	Th	Med.
277	**Fumariaceae**	***Fumaria parviflora* Lam.**	**Th**	**Med./ Eur-Si.**
278	Gentianaceae	*Centaurium pulchellum* (Swartz.) Druce.	Th	Med.
279	**Geraniaceae**	***Erodium arborescens* Desf.**	**H**	**Sah-Ar.**
280	Geraniaceae	*Erodium glaucophyllum* (L.) L 'Herit.	H	Sah-Ar.
281	**Geraniaceae**	***Erodium hirtum* (Frorsk.) Will.**	**Th**	**Sah-Ar.**
282	Geraniaceae	*Erodium laciniatum* (Cav.) Willd.	Th	Med.
283	**Geraniaceae**	***Erodium malacoides* (L.) L Her.**	**Th**	**Med./ Ir-Tu.**
284	Geraniaceae	*Erodium moschatum* (L.) L Her.	Th	Med.
285	**Hypecoaceae**	***Hypecoum procumbens* L.**	**Th**	**Med.**
286	Illecebraceae	*Gymnocarpos decander* Forsk.	Ch	Med./ Ir-Tu.
287	**Illecebraceae**	***Herniaria hemistemon* J.Gay in Duch.**	**H**	**Med./ Ir-Tu.**
288	Illecebraceae	*Paronychia arabica* (L.) DC.	Th	Med./ Ir-Tu.
289	**Illecebraceae**	***Paronychia argentia* Lam.**	**H**	**Med./ Ir-Tu.**
290	Lamiaceae	*Ajuga iva* (L.) Schreber	H	Med./ Ir-Tu.
291	**Lamiaceae**	***Lavandula multifida* L.**	**Ch**	**Med./ Ir-Tu.**
292	Lamiaceae	*Lithodora rosmarinifolia* (Ten.) Johnst.	Ch	Med.
293	**Lamiaceae**	***Marrubium alysson* L.**	**H**	**Med.**
294	Lamiaceae	*Marrubium vulgare* L.	H	Med./ Ir-Tu.
295	**Lamiaceae**	***Micromeria nervosa* (Desf.) Benth.**	**Ch**	**Med.**
296	Lamiaceae	*Prasium majus* L.	NP	Med.
297	**Lamiaceae**	***Rosmarinus officinalis* L.**	**Ch**	**Med.**
298	Lamiaceae	*Salvia aegyptiaca* L.	Ch	Sah-Ar./ Sud.
299	**Lamiaceae**	***Salvia lanigera* Poir.**	**Th**	**Med./ Ir-Tu.**
300	Lamiaceae	*Salvia verbenaca* L.	Th	Med./ Ir-Tu./ Eur-Si.
301	**Lamiaceae**	***Teucrium polium* L.**	**Ch**	**Med./ Ir-Tu./ Eur-Si.**
302	Lamiaceae	*Thymus capitatus* (L.) Hoffm. & Link	Ch	Med.
303	**Linaceae**	***Linum strictum* L.**	**Th**	**Med.**
304	Malvaceae	*Malva parviflora* L.	Th	Med./ Eur-Si.
305	**Malvaceae**	***Malva sylvestris* L.**	**H**	**Med./ Ir-Tu.**
306	Mimosaceae	*Acacia cyanophylla* Lindley.	Ph	Ir-Tu.
307	**Moraceae**	***Ficus carica* L.**	**Ph**	**Med.**
308	Neuradaceae	*Neurada procumbens* L.	Th	Med./ Ir-Tu./ Sah-Ar.
309	**Oleaceae**	***Olea europaea* L.**	**Ph**	**Med.**
310	Orobanchaceae	*Orobanche lavandulacea* Rechenb.	Th	Med./ Ir-Tu.
311	**Oxalidaceae**	***Oxalis pes-caprae* L.**	**Geo**	**Plu.**
312	Papaveraceae	*Glaucium flavum* Crantz.	H	Med./ Eur-Si.
313	**Papaveraceae**	***Papaver decaisnei* Hochst et Steud.**	**Th** **Med./ Ir-Tu.**	**Med./ Ir-Tu.**
314	Papaveraceae	*Papaver dubium* L.	Th`	Plu.
315	**Papaveraceae**	***Papaver hybridum* L.**	**Th**	**Med.**
316	Papaveraceae	*Papaver rhoeas* L.	Th	Med./ Ir-Tu.
317	**Papaveraceae**	***Roemeria hybrida* (L.) DC.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**

318	Plantaginaceae	*Plantago afra* L.	Th	Med./ Ir-Tu.
319	**Plantaginaceae**	***Plantago albicans* L.**	**H**	**Med./ Ir-Tu.**
320	Plantaginaceae	*Plantago amplexicaulis* Cav.	Th	Med./ Ir-Tu.
321	**Plantaginaceae**	***Plantago coronopus* L**	**Th**	**Med./ Ir-Tu.**
322	Plantaginaceae	*Plantago crassifolia* Forskal.	H	Med.
323	**Plantaginaceae**	***Plantago crypsoides* Boiss.**	**Th**	**Med.**
324	Plantaginaceae	*Plantago lagopus* L.	Th	Med./ Ir-Tu./ Eur-Si.
325	**Plantaginaceae**	***Plantago lanceolata* L.**	**H**	**Med./ Ir-Tu./ Sah-Ar.**
326	Plantaginaceae	*Plantago notata* Lag.	Th	Med./ Ir-Tu.
327	**Plumbaginaceae**	***Limonaistrum monopetalum* (L.) Boiss.**	**Ch**	**Med.**
328	Plumbaginaceae	*Limonium pruinosum* (L.) O.Kitze. *Var. hirtiflorum* (Cavara) Tack.	H	Med.
329	**Plumbaginaceae**	***Limonium sibthorpianum* (Guss.) O. Kuntze.**	**Th**	**Med.**
330	Polygonaceae	*Calligonum azel* Maire.	NP	Med./ Sah-Ar.
331	**Polygonaceae**	***Emex spinosus* L**	**Th**	**Med./ Ir-Tu.**
332	Polygonaceae	*Polygonum equisetiforme* Sibth.	Ch	Plu.
333	**Polygonaceae**	***Rumex vesicarius* L.**	**Th**	**Sah-Ar.**
334	Polygonaceae	*Polygonum maritimum* L.	H	Med.
335	**Polygonaceae**	***Rumex bucephalophorus* L.**	**Th**	**Med.**
336	Polygonaceae	*Rumex pictus* Forsk.	Th	Med.
337	**Portulacaceae**	***Portulaca oleracea* L.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
338	Primulaceae	*Anagallis arvensis* L.	Th	Med./ Ir-Tu./ Eur-Si.
339	**Ranunculaceae**	***Adonins dentata* Delile.**	**Th**	**Med./ Ir-Tu.**
340	Ranunculaceae	*Adonis microcarpa* DC	Th	Med./ Ir-Tu.
341	**Ranunculaceae**	***Delphinium halteratum* Sibth. & Smith.**	**Th**	**Med.**
342	Ranunculaceae	*Myosurus minimus* L.	Th	Med./ Ir-Tu.
343	**Ranunculaceae**	***Nigella arvensis* L.**	**Th**	**Med./ Ir-Tu.**
344	Ranunculaceae	*Nigella damascena* L.	Th	Med./ Ir-Tu.
345	**Ranunculaceae**	***Ranunculus asiaticus* L.**	**Th**	**Med.**
346	Resedaceae	*Reseda alba* L.	Th	Med./ Ir-Tu./ Eur-Si.
347	**Rhamnaceae**	***Ziziphus lotus* (L.) Lam.**	**NP**	**Med./ Sud.**
348	Rubiaceae	*Galium parisiense* L.	Th	Med./ Ir-Tu./ Eur-Si.
349	**Rubiaceae**	***Galium setaceum* Lam.**	**Th**	**Ir-Tu**
350	Rubiaceae	*Galium tricornutum* Dandy.	Th	Med./ Ir-Tu./ Eur-Si.
351	**Rubiaceae**	***Sheradia arvensis* L.**	**Th**	**Med./ Ir-Tu.**
352	Rubiaceae	*Valantia hispida* L.	Th	Med.
353	**Rutaceae**	***Haplophyllum tuberculatum* (Forsk.) Juss.**	**H**	**Med./ Sud.**
354	Rutaceae	*Ruta chalepensis* L.	Th	Ir-Tu./ Sah-Ar.
355	**Santalaceae**	***Thesium humile* Vahl.**	**Th**	**Med.**
356	Scrophulariaceae	*Linaria tarhunensis* Pamp.	Th	Med.
357	**Scrophulariaceae**	***Kickxia egyptica* L.**	**H**	**Med./ Sah-Ar.**
358	Scrophulariaceae	*Linaria tenuis* (Viv.) Sperng.	Th	Med./ Sah-Ar.
359	**Scrophulariaceae**	***Scrophularia canina* L.**	**H**	**Med.**
360	Scrophulariaceae	*Scrophularia hypercifolia* Wild..	Ch	Sah-Ar.
361	**Solanaceae**	***Datura inoxia* Mill.**	**Th**	**Med.**
362	Solanaceae	*Hyoscyamus albus* L.	Th	Med.
363	**Solanaceae**	***Lycium showeinfurthii* Dammer in Bot.**	**NP**	**Med.**
364	Solanaceae	*Nicotiana glauca* R. C. Graham.	NP	Plu.
365	**Solanaceae**	***Solanum nigrum* L.**	**Th**	**Cos.**
366	Tamaricaceae	*Reaumuria vermiculata* L.	Ch	Med.
367	**Tamaricaceae**	***Tamarix aphylla* Graham.**	**NP**	**Sah-Ar./ Sud.**
368	Thymelaeaceae	*Thymelaea hirsuta* (L.) Endl	Ch	Med.
369	**Urticaceae**	***Urtica pilulifera* L.**	**Th**	**Med./ Ir-Tu./ Eur-Si.**
370	Urticaceae	*Urtica urens* L.	Th	Med./ Ir-Tu.
371	**Verbinaceae**	***Lantana camara* L.**	**NP**	**Med./ Ir-Tu./ Trop.**
372	Zygophyllaceae	*Fagonia cretica* L.	H	Med.

373	**zygophyllaceae**	***Nitraria retusa* (Forsk.) Aschers.**	**NP**	**Med./ Ir-Tu.**
374	Zygophyllaceae	*Peganum harmala* L.	Th	Med./ Ir-Tu.
375	**Zygophyllaceae**	***Zygophyllum album* L.**	**Ch**	**Med.**

4. Conclusion

The present study is the first research to investigate the floral diversity of the study area. The study revealed presence of 375 different plant species representing 62 families. The family Asteraceae was the most dominant with 65 species. The results have also shown that the genus Plantago, and is the most sizable genus with 9 species. Lifeform spectrum analysis have shown the predominance of therophytes with 218 species, while chorotype spectrum analysis have shown the dominance of Mediterranian species with 164 species.

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