JOURNAL OF ADVANCED
BOTANY AND ZOOLOGY
Journal homepage: http://scienceq.org/Journals/JABZ.php
ISSN
2348 – 7313
V7I3.04
Research Article
Open Access

Floristic Study and Species Diverisy of Msallata-Garaboulli Province in Libya

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Received: February 12, 2020, Accepted: April 14, 2020, Published: April 14, 2020.

ABSTRACT
A survey of plant species of Msallata and Garaboulli was taken in between 2017-2018. A total number of 468 different plant taxa have been collected from the study area representing 68 families of which 57 families and 389 species are belonging to dicotyledons, 8 families and 76 species belonging to monocotyledons, and 3 families with one species each belonging to Gymnosperms. The results of this study shows that the dominance of the family Asteraceae with 78 species followed by the family Fabaceae with 59 species, the family Poaceae with 47 species, Brassicaceae with 27 species and Apiaceaew with 19 species. Other families such as Liliaceae, Caryophylaceae, Lamiaceae, Cistaceae, Boraginaceae, Plantaginaceae, and Rubiaceae were represented by 16, 15, 14, 13, 12, 10, 10 species respectively. The result have also shown that the gerera *Plantago*, and *Silene* are the most sizable genera with 10, 8 species respectively. Lifeform spectrum analysis have shown the predominance of therophytes with 231 species, followed by Hemicryptophytes with 62 species, while chorotype spectrum analysis have shown the dominance of Mediterranian species, followed by Mediterrean/Iranu-Turanean species.

Keyword: Flora, Floristic, Plant diversity, Msallata, Gharaboulli

INTRODUCTION
vascular plant species (excluding Pteridophytes) belonging to 787 genera, and 155 families. While, [1] recorded about 2,118 species belonging to 864 genera and 161 families in Libya, of them 2,088 species, 844 genera and 145 families, are Angiosperms, 15 species of 8 genera and 6 families are Gymnosperms and 15 species of 12 genera and 10 families are Pteridophyta. .

Of which seed plants were charactherized by highest number of herbs (annual to perennial), and low number of woody (tree and shrub) species; these have an important influence on the structure of floral composition, the geographic element of the flora was predominantly tropical and Mediterranean [8]. The floristic composition of plants in Libya is still comparatively unknown as far as in-depth ecological and botanical studies [9].

The history of plant exploration in Libya has become the interest of many workers. For example, the most comprehensive floristic studies in Libya was presented as a preliminary checklist of the flora of Libya by [10], and Flora of Libya by [6], furthermore. In addation to that**,** there were a few regional floristic studies on Msallata district such as biodiversity of the Msallata national reserve [11], and flora of Wadi Gerreem [12]. Since the flora of Msallata and El-Garaboulli has not been studied thoroughly during the work on the flora of Libya (1976-1989). Therefore, the purpose of this survey is to have an exclusive study to its flora.

STUDY AREA
This paper deals mainly with the flora of Msallata and El-Garaboulli Districts, which is located about 60 km., east of Tripoli (Capital) and occupies between. (34◦ 32’ 58.87” N, 02◦ 14’ 20.89” E), and it is ranges between 100- 500 m above the see level as measured by GPS. The study area is bounded by the sea to the north, El-Gweaa to the west, Al-koms to the east, and Tarnuna to the south (Figure 1). The climate of the study area 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 [13]**.**

Figure 1: Shows the study area.

METHODS
A total number of 468 plant specimens were collected in between 2017-2018 upon various field trips. The collected plants were then treated by the usual herbarium procedures including pressing, poisoning, mounting, labeling, and identifying. Collection and Identification of plant species was done by the authors with the aid of the following litheratures [6, 10, 14]. Eventually, the identified plant specimens were deposited at the national herbarium, Botany Department, Faculty of Sciences, Tripoli University.

RESULTS & DISCUSSION
The flora of Msallata and Garaboulli represented by 468 different plant taxa belonging to 68 families, 247 genera, and 468 species. Three different plant groups gymnosperms with 3 families and 3 species, dicotyledones with 57 families and 389 species, and monocotyledons with 8 families and 76 species (Table 5). The families Asteraceae, Fabaceae, Poaceae, and Brassicaceae are considered as the most dominant and sizable families with 76, 59, 47 and 27 plant species respectively (Table 1 & figue 2). Other families such as Apiacaceae, Liliaceae, Caryophyllaceae, Lamiaceae, and Cictaceae are less dominant and represented by 19, 16, 15, 14 & 13 species respectively. Whereas, the rest of the families are represented by 12 species or less. The results of this study shows that the most dominant genera are *plantago with* 10

species, and *Silene* with 8 specie. Whilst, genera such as *Medicago*, *Erodium*, *Euphorbia*, Helianthemum and *Centaurea* are represented by 7 species each. Genera such as *Astragalus*, *Ononis*, *Convolvulus* and *Bupleurum* represented by 6 species each.While, the rest of the genera are represented by 5 species or less (Table 2 & figure 3).

Table 1: Shows dominant families

Family	No of species
Asteraceae	76
Fabaceae	59
Poaceae	47
Brassicaceae	27
Apiaceae	19
Liliaceae	16
Cryophyllaceae	15
Lamiaceae	14
Cistaceae	13
Boraginaceae	12
Plantaginaceae	10
Rubiaceae	10

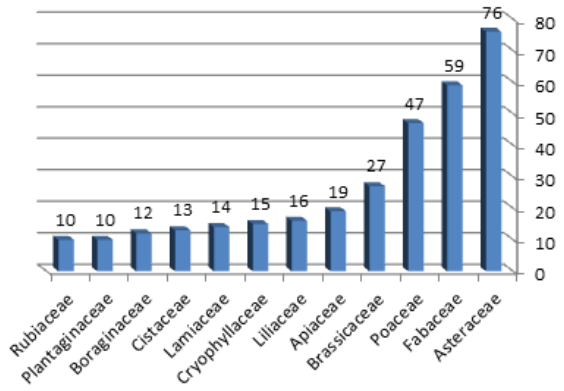

Figure 2: Shows dominant families

Table 2: Shows dominant genera

Genus	No of species
Plantago	10
Silene	8
Medicago	7
Helianthemum	7
Euphorbia	7
Erodium	7
Centaurea	7
Astragalus	6
Ononis	6
Convolvulus	6
Buplaurum	6
Trifolium	5
Gallium	5
Bromus	5

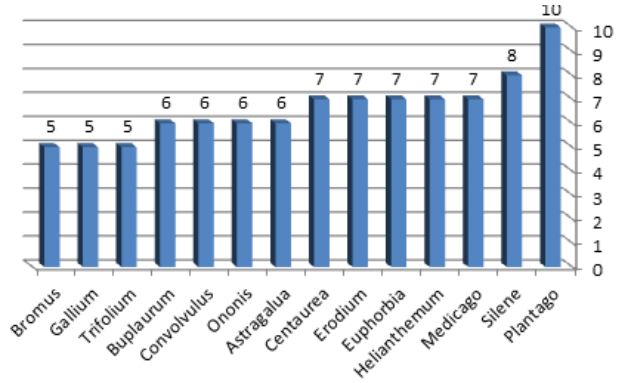

Figure 3: shows dominant genera.

Life form spectrurm of species was analyzed according to Raunkiae system [15] as modified by Govaerts *et al*, [16]. Such system showed absolute dominance of Therophytes with 302 species, followed by Hemicryptophytes with 62 species, and Geophytes with 44 species, the rest of life forms were less frequent, that Chaemephytes with 27 species, Nanophanerophytes with 23 species, and Phanerophytes with 11 species (Tables 3 and 5) (Fig 4).

Table 3: Shows lifeforms of different species.

Lifeform	No of species	%
Therophytes	302	65.5
Hemicryptophtes	62	13.25
Geophytes	44	9.4
Chaemephytes	27	5.5
Nanophanerophytes	23	4.9
Phanerophytes	11	2.35

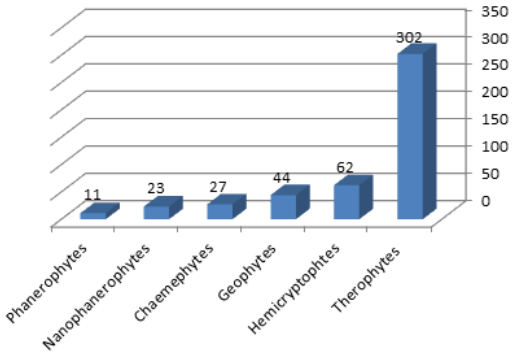

Figure 4: Shows lifeforms of different species.

Chorological spectrum of collected and identified plant species were also analyzed. The results have shown absolute predominance of Mediterranean species with 231 species, followed by Med./ Ir-Tu. species with 101 species, Med./ Ir-Tu./ Eur-Si species with 27 species, and Pluriregionsl species with 26 species, the rest of chorological spectra were with little frequent as shown in (Tables 4, 5) (Fig 5).

Table 4: Shows number of species and their percentage in chorotypes.

Chorotype	No of species	%
Med	231	49.3
Med./ Ir-Tu.	101	21.6
Med./ Ir-Tu./ Eur-Si.	27	5.8
Plu	26	5.5
Med./ Eur-Si.	22	4.7
Sah-Ar.	20	4.3
Med./ Sah-Ar.	6	1.3
Cos	5	1.0
Ir-Tu./ Sah-Ar.	4	0.9
Ir-Tu	3	0.7

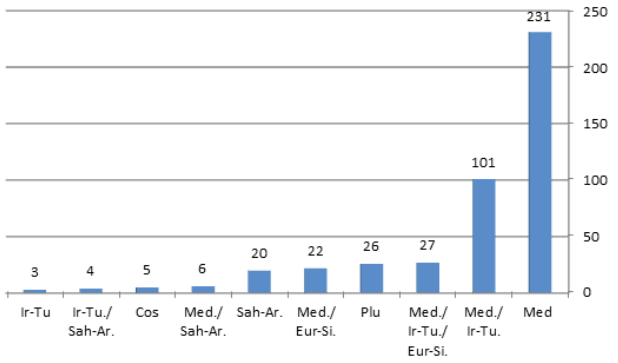

Figure 5: Shows number of species in chorotypes.

The dominance of the familes Asteraceae, Fabaceae, Poaceae was expected because such families dominated the Mediterranean climate. In addation to that, these families are cosmopolitan in distribution. Moreover, the dominance of Therophytes and Mediterranean chorotypes agreed with our expectations since the study area falls within the coastal Mediterranean region. The results have also been revealed that the most characteristic features of the flora of Msallata & Garaboulli is that the large number of families recorded in this study, wchic is close to the half number of the total families in the flora of Libya, this findings indicates that the flora of Msallata-Gharaboulli is rich.

No	Family	Species	Lifeform	Chorotype
		Gymnosperms		
1	Cupressaceae	*Juniperus phoenicea* L.	Ph	Med.
2	Ephedraceae	*Ephedra altissima* Desf.	NP	Med.
3	Pinaceae	*Pinus halipensis* L.	Ph	Med.
		Monocotyledons		
4	Alliaceae	*Allium ampeloprasum* L.	Geo	Med.
5	"	*Allium negrianum* Maire & Weiller	Geo	Med.
6	"	*Allium nigrum* L.	Geo	Med.
7	"	*Alliumleucanthum* C. Koch in L.	Geo	Med.
8	Amaryllidaceae	*Pancartium maritimum* L.	Geo	Med.
9	"	*Pancratium foetidum* Pomel.	Geo	Med.
10	Araceae	*Arisarum vulgare* Targ. Tozz	Geo	Med.
11	Cyperaceae	*Scirpus holoschoenus* L.	Geo	Med./ Ir-Tu.
12	Iridaceae	*Gladiolus byzantinus* Miller.	Geo	Med.
13	"	*Iris planifolia* (Mill.) Durand & Barratte	Geo	Med./ Ir-Tu.
14	"	*Iris sisyrinchium* L.	Geo	Med.
15	Liliaceae	*Androcymbium gramineum* (Cav.) Mc Brid	Geo	Med.
16	"	*Asparagus aphyllus* L.	Geo	Med.
17	"	*Asparagus stipularis* Forsk.	Geo	Med.
18	"	*Asphodelus aestivus* Brot.	Geo	Med.
19	"	*Asphodelus fistulosus* L.	Geo	Med.
20	"	*Asphodelus microcarpus* Salzm. & Viv.	Geo	Med.
21	"	*Bellevalia sessiliflora* (Viv.)Kunth	Geo	Med.
22	"	*Dipcadi serotinum* (L.) Medic.	Geo	Plu.
23	"	*Gagea fibrosa* (Desf.) Schult.	Geo	Med.
24	"	*Muscari comosum* (L.) Mill.	Geo	Med.
25	"	*Muscari racemosum* (L.) Mill.	Geo	Med.
26	"	*Ornithogalum arabicum* L	Geo	Med.
27	"	*Ornithogalum pyrenaicum* L.	Geo	Med./ Ir-Tu./ Eur-Si.
28	"	*Scilla peruviana* L.	Geo	Med.
29	"	*Urginea autumnalis* L.	Geo	Med.
30	"	*Urginea maritima* (L.) Baker	Geo	Med.
31	Orchidaceae	*Ophrys speculum* Link.	Geo	Med.
32	"	*Orchis coriophora* L.	Geo	Med./ Ir-Tu.
33	Poaceae	*Aegilops geniculata* Roth.	Th	Med./ Ir-Tu.
34	"	*Aegilops Kotschyi* Boiss.	Th	Med./ Ir-Tu.
35	"	*Aristida adscensionis* L.	Th	Med.
36	"	*Avellinia mitchelii*	Th	Med.
37	"	*Avena barbata* Pott. ex Link.	Th	Med./ Ir-Tu.
38	"	*Avena sterilis* L.	Th	Med./ Ir-Tu.
39	"	*Briza maxima* L.	Th	Med.
40	"	*Bromus diandrus* Roth.	Th	Med.
41	"	*Bromus madritensis* L.	Th	Plu.
42	"	*Bromus molliformis* Lloyd.	Th	Med./ Eur-Si.
43	"	*Bromus rigidus* Roth.	Th	Med./ Eur-Si

44	"	*Bromus rubens* L.	Th	Med./ Ir-Tu./ Eur-Si.
45	"	*Catapodium marinum* L.	Th	Med./ Eur-Si.
46	"	*Cenchrus ciliaris* L.	Th	Sah-Ar.
47	"	*Cutandia dichotoma* (Forsk) Trabut.	Th	Med./ Ir-Tu.
48	"	*Cutandia maririma* (L.) Barbey	Th	Med.
49	"	*Cynodon dactylon* (L.) Pers.	Geo	Boreal. Trop.
50	"	*Cynosurus coloratus* Lehm. ex Steud.	Th	Med.
51	"	*Cynosurus elegans* Desf.	Th	Med./ Ir-Tu.
52	"	*Dactylis glomerata* L.	Th	Med./ Ir-Tu.
53	"	*Gastridium ventricosum* (Gouan.) Schin et Thell.	Th	Med./ Ir-Tu.
54	"	*Hordeum murinum* L.	Th	Plu.
55	"	*Hordeum spontaneum* C. Koch.	Th	Med./ Ir-Tu.
56	"	*Hyparrhenia hirta* (L.) Stapf	H	Plu.
57	"	*Imperata cylindrica* (L.) Reauschel.	Geo	Med./ Ir-Tu.
58	"	*Lagurus ovatus* L.	Th	Plu.
59	"	*Lamarckia aurea* (L.) Moench	Th	Med./ Ir-Tu./ Sud
60	"	*Lolium loliaceum* Bory & Chaub.	Th	Med./ Ir-Tu.
61	"	*Lolium multiflorum* Lam.	Th	Med./ Eur-Si.
62	"	*Lolium rigidum* Gaud.	Th	Plu.
63	"	*Lophochloa salzmannii* Boiss &H.scholz	Th	Med.
64	"	*Lygeum spartum* Loefl. ex L.	Geo	Med.
65	"	*Parapholis incurve* (L.) C.E. Hubbard	Th	Med./ Ir-Tu./ Eur-Si
66	"	*Pennisetum divisum* (Forsk. ex Gmel.) Hem.	Geo	Sah-Ar.
67	"	*Pennisetum setaceum* (Forsk.) Chiov.	Geo	Med./ Ir-Tu./ Sud.
68	"	*Phalaris minor* Retz.	Th	Med./ Ir-Tu.
69	"	*Phragmites australis* (Cav.) Trin. ex steud.	Geo	Cos.
70	"	*Piptatherum miliaceum* (L.) Coss.	H	Med.
71	"	*Poa annua* L.	Th	Plu.
72	"	*Poa sinaica* L.	H	Ir-Tu.
73	"	*Polypogon monspeliensis* (L) Desf.	Th	Plu.
74	"	*Psilurus incurvus* Gouan.	Th	Med./ Ir-Tu.
75	"	*Stipa barbata* Desf.	Geo	Med./ Ir-Tu.
76	"	*Stipa capensis* Thunb.	Th	Med./ Ir-Tu./ Sah-Ar.
77	"	*Stipa parviflora* Desf.	Geo	Med./ Ir-Tu.
78	"	*Stipa tenacissima* L.	Geo	Med.
79	"	*Trachynia distachya* (L.) Link.	Th	Med./ Ir-Tu.
Dicotyledones				
80	Aizoaceae	*Carpobrotus edulis* (L.) N. E. Brown in Philip.	Geo	Plu.
81	Amaranthaceae	*Amaranthus blithoides* S. Watson.	Th	Med./ Eur-Si.
82	Amaranthaceae	*Amaranthus retroflexus* L.	Th	Med./ Eur-Si
83	"	*Amaranthus viridis* L.	Th	Trop.
84	Anacardiaceae	*Pistacia lentiscus* L.	NP	Med./ Ir-Tu.
85	"	*Rhus tripartita* (Ucria.) Grande.	NP	Med.
86	Apiaceae	*Ammi majus* L.	Th	Med.
87	"	*Anethum graveolens* L.	Th	Med./ Ir-Tu.
88	"	*Bunium fontainesii* (Pers.) Maire.	Geo	Med.
89	"	*Bupleurum lancifolium* Hornem.	Th	Med./ Ir-Tu.
90	"	*Bupleurum gibraltaricum* Lam.	Ch	Plu.
91	"	*Bupleurum odontites* L.	Th	Med.
92	"	*Bupleurum semicopositum* L.	Th	Med./ Ir-Tu.
93	"	*Bupleurum trichopodum* Boiss.	Th	Med.
94	"	*Daucus capillifolius* Gilli.	Th	Med.
95	"	*Daucus jordanicus* Bost.	Th	Med./ Sah-Ar.
96	"	*Daucus syrticus* Murb.	Th	Med.
97	"	*Ferula tingitana* L.	H	Med.
98	"	*Pimpinella peregrina* L.	H	Med.
99	"	*Pituranthos tortuousus* (Desf.) Benth & Hok.	Ch	Med.

100	"	*Scandix australis* L.	Th	Med.
101	"	*Scandix pectin-veneris* L	Th	Med./ Eur-Si.
102	"	*Torilis leptophylla* L.	Th	Med./ Ir-Tu.
103	"	*Torilis nodosa* (L.) Gaertn.	Th	Med./ Ir-Tu./ Eur-Si.
104	"	*Torilis tenella* Del.	Th	Med.
105	Asclepiacaceae	*Caralluma europaea* (Guss.) N.E.Br.	H	Med.
106	"	*Calotropis procera* (Ait.) Ait.	NP	Sud./ Sah-Ar.
107	"	*Periploca angustifolia* Labill .	NP	Med.
108	Asteraceae	*Amberboa libyca* (Viv.)Alavi	Th	Med.
109	"	*Amberboa lippii* (L) DC.	Th	Sah-Ar.
110	"	*Amberboa tubiflora* Murb.	Th	Med.
111	"	*Anacyclus clavatus* (Desf.) Pers.	Th	Med.
112	"	*Anacyclus monanthos* (L.) Thell.	Th	Med.
113	"	*Andryala integrifolia* L.	Th	Med.
114	"	*Anthemis secundiramea* Biv.	Th	Med.
115	"	*Artemisia campestris* L.	H	Med./ Eur-Si.
116	"	*Asteriscus pygmaeus* DC.	Th	Ir-Tu./ Sah-Ar.
117	"	*Atractylis cadruus* (Forsk.) Christ in Dansk.	H	Sah-Ar.
118	"	*Atractylis cancellata* L.	Th	Med.
119	"	*Atractylis serrata* Pomel	Th	Med.
120	"	*Atractylis serratuloides* Sieb. ex Cass.	H	Sah-Ar.
121	"	*Bombycilaena discolor*Pers .	Th	Med.
122	"	*Calendula arvensis* L.	Th	Med./ Ir-Tu.
123	"	*Carduncellus pinnatus* (Desf.) DC.	H	Med.
124	"	*Carduus argentatus* Durieu in Duchartre.	Th	Med.
125	"	*Carduus getulus* Pomel	Th	Sah-Ar
126	"	*Carlina involucrata* Boint .	Th	Med.
127	"	*Carlina sicula* Ten.	Th	Med.
128	"	*Carthamus lanatus* L.	Th	Med./ Ir-Tu./ Eur-Si.
129	"	*Centaurea africana* Lam.	H	Med.
130	"	*Centaurea alexandrina* Delile	Th	Med.
131	"	*Centaurea dimorpha* Viv.	H	Med./ Ir-Tu.
132	"	*Centaurea glomerata* Vahl.	Th	Med.
133	"	*Centaurea maroccana* Ball.	Th	Med.
134	"	*Centaurea melitensis* L.	Th	Med./ Eur-Si.
135	"	*Centaurea sphaerocephala* L.	H	Med.
136	"	*Chamomilla aurea* Loefl	Th	Med./ Ir-Tu.
137	"	*Chrysanthemum carinatum* Schousboe	Th	Med./ Eur-Si
138	"	*Chrysanthemum coronarium* L.	Th	Med.
139	"	*Cichorium pumilum* Jacq	Th	Med./ Ir-Tu.
140	"	*Conyza aegyptiaca* (L.)Dryander	Th	Med.
141	"	*Conyza bonariensis* L	Th	Med.
142	"	*Conyza canadensis*L	Th	Cos.
143	"	*Crepis libyca* Pamp.	H	Med.
144	"	*Crepis senecioides* Delile.	Th	Med.
145	"	*Crepis vesicaria* L.	H	Med./ Eur-Si.
146	"	*Crupina crupinastrum* (Moris) Vis.	Th	Med./ Ir-Tu.
147	"	*Cynara cardunculus* L.	H	Med.
148	"	*Echinops galalensis* Schweinf.	H	Med.
149	"	*Echinops hirsutissimum*Turra.	H	Med.
150	"	*Filago desertorum* Pomel	Th	Ir-Tu./ Sah-Ar.
151	"	*Filago pyramidata* L.	Th	Med./ Ir-Tu.
152	"	*Hedypnois cretica* (L.) Dum.-Courset	Th	Med.
153	"	*Helichrysum stoechas* (L.)Moench	H	Med.
154	"	*Hyoseris scabra* L.	Th	Med.
155	"	*Hypochoeris achyrophorus* L.	Th	Med.
156	"	*Hypochoeris glabra* L.	Th	Med.
157	"	*Koelpinia linearis* Pallas.	Th	Med./ Eur-Si.
158	"	*Launaea nudicaulis* L.	H	Sah-Ar./ Sud. /Ir-Tu.
159	"	*Launaea procumbens* Roxb.	H	Med./ Ir-Tu.

160	"	*Launaea resedifolia* (L.) O. Kuntze	H	Med.
161	"	*Leontodon hispidulus* Delile.	Th	Med./ Ir-Tu.
162	"	*Leontodon simplex* (Viv.) Widder	Th	Med./ Eur-Si.
163	"	*Leontodon tuberosus* L	H	Med.
164	"	*Nolletia chrysocomides* Desf.	H	Med.
165	"	*Notobasis syriaca* (L.) Cass.	Th	Med./ Ir-Tu.
166	"	*Onopordum confusum* Pamp.	H	Med.
167	"	*Onopordum espinae* Cosson exBonnet	H	Med.
168	"	*Pallenis spinosa* (L.) Cass.	H	Med./ Ir-Tu.
169	"	*Phagnalon rupestre* (L.) DC.	H	Med./ Ir-Tu.
170	"	*Picris asplenoides* L.	Th	Sah-Ar.
171	"	*Reichardia tingitana* (L.)Roth	Th	Ir-Tu./ Sah-Ar.
172	"	*Rhagadiolus stellatus* (L.)Gaertner	Th	Med./ Ir-Tu.
173	"	*Scorzonera undulata* Vahl	Geo	Med.
174	"	*Senecio gallicus* Chiax	Th	Med.
175	"	*Silybum marianum* (L.) Gaertner	Th	Med./ Ir-Tu./ Eur-Si
176	"	*Sonchus asper* (L.)Hill	H	Med./ Ir-Tu.
177	"	*Sonchus oleraceus* L.	Th	Cos.
178	"	*Sonchus tenerrimus* L.	Th	Med./ Ir-Tu./ Sud.
179	"	*Tripleurospermum trifuscatum* (Desf.) Schultz	Th	Med.
180	"	*Urospermum delachampii* L.	H	Med.
181	"	*Urospermum picroides* (L.) Scop. Ex Schmidt.	Th	Med./ Ir-Tu.
182	"	*Verbasina encelioides* (Cav.) Benth. & Hook.	Th	Americas
183	"	*Xanthium spinosum* L	Th	Boreal-Trop.
184	Boraginaceae	*Alkanna tinctoria* (L.) Tausch.	H	Med.
185	"	*Arnebia decumbens* Vent.	Th	Med./ Ir-Tu.
186	"	*Buglossoides tenuiflora* (L.f.) I.M. Johnst.	Th	Med./ Ir-Tu.
187	"	*Cynoglossum cheirifolium* L.	Th	Med.
188	"	*Echiochilon fruticosum* Desf.	Ch	Med.
189	"	*Echium angustifolium* Mill.	H	Med.
190	"	*Echium humile* Desf.	H	Med.
191	"	*Elizaldia calycina* Roem.	Th	Med.
192	"	*Heliotropium europaeum* L.	Th	Med.
193	"	*Lappula spinocarpos* Forsk.	Th	Med./ Ir-Tu.
194	"	*Neatostema apulum* (L.) I.M. Johnst.	Th	Med.
195	"	*Nonea micrantha* Boiss. & Reuter	Th	Med.
196	Brassicaceae	*Biscutella didyma* L.	Th	Med./ Ir-Tu.
197	"	*Brassica tournefortii* Gouan.	Th	Med./ Sah-Ar.
198	"	*Cakile aegyptiaca* (L.) Willd.	Th	Med./ Eur-Si.
199	"	*Capsella bursa-pastoris* (L.) Medik.	Th	Plu.
200	"	*Cardaria draba* L .Desv.	Th	Med./ Eur-Si.
201	"	*Carrichtera annua* (L.) DC.	Th	Med./ Ir-Tu./ Eur-Si.
202	"	*Clypeola jonthlaspi* L.	Th	Med./ Ir-Tu./ Eur-Si.
203	"	*Didesmus aegyptius* L & Desv.	Th	Med.
204	"	*Didesmus bipinnatus* (Desf.) DC.	Th	Med.
205	"	*Diplotaxis harra* (Forsk.)Boiss.	Th	Med./ Ir-Tu.
206	"	*Diplotaxis muralis* (L.) DC.	Th	Med./ Eur-Si.
207	"	*Enarthrocarpus clavatus* Del. ex Godr**.**	Th	Med.
208	"	*Eruca longirostris* Uechtr.	Th	Med.
209	"	*Eruca sativa* Mill.	Th	Med./ Ir-Tu.
210	"	*Eurcaria microcarpa* Boiss.	Th	Med./ Sah-Ar.
211	"	*Lepidium sativum* L	Th	Plu.
212	"	*Lobularia libyca* (Viv.) Meisner.	Th	Med./ Ir-Tu.
213	"	*Lobularia maritima* L & Desv.	H	Med.
214	"	*Lonchophora kralikii* Pomel	Th	Med.
215	"	*Matthiola longipetala* (Vent.) DC.	Th	Med./ Ir-Tu.
216	"	*Matthiola parviflora* (Schousbe.) R.Br. In Ait.	Th	Sah-Ar.
217	"	*Rapistrum rugosum* (L.) All.	Th	Med./ Ir-Tu.
218	"	*Sinapis alba* L.	Th	Med./ Ir-Tu./ Eur-Si.
219	"	*Sinapis flexuosa* Poir.	Th	Med.

220	"	*Sinapis pubescens* L.	Th	Med.
221	"	*Sisymbrium erysimoides* Desf.	Th	Med./ Ir-Tu.
222	"	*Sisymbrium irio* L	Th	Med./ Ir-Tu.
223	Cactaceae	*Opuntia ficus-indica* (L.) Mill.	NP	Med./ Trop.
224	Caeslpiniaceae	*Ceratonia siliqua* L.	Ph	Med.
225	Capparaceae	*Capparis spinosa* L	NP	Med.
226	Caryophyllaceae	*Arenaria serpyllifolia* L.	Th	Med./ Ir-Tu./ Eur-Si.
227	"	*Cerastium glomeratum*Thuill.	Th	Med./ Ir-Tu./ Eur-Si.
228	"	*Cerastium pumilum* Curtis.	Th	Med./ Ir-Tu.
229	"	*Minuartia hybrida* Vill.	Th	Med./ Ir-Tu.
230	"	*Polycarpon tetraphyllum* L.	Th	Med./ Eur-Si.
231	"	*Silene apetala* Willd.	Th	Med./ Ir-Tu.
232	"	*Silene behen* L.	Th	Med.
233	"	*Silene cerastioides* L.	Th	Med.
234	"	*Silene colorata* Poiret.	Th	Med.
235	"	*Silene gallica* L	Th	Cos.
236	"	*Silene tridentata* Desf.	Th	Med.
237	"	*Silene villosa* Forsk.	Th	Med.
238	"	*Silene viviani* Teud.	Th	Med.
239	"	*Spergularia bocconii* (Sol.) Ash et Grbn.	Th	Med./ Ir-Tu.
240	"	*Spergularia diandra* (Guss.) Heldr. & Sart.	Th	Med./ Ir-Tu./ Eur-Si.
241	Chenopodiaceae	*Beta vulgaris* L.	Th	Med./ Ir-Tu./ Eur-Si.
242	"	*Chenopodium album* L.	Th	Plu.
243	"	*Chenopodium murale* L.	Th	Plu.
244	"	*Salsola kali* L.	Th	Plu.
245	Cistaceae	*Cistus parviflorus* Lam.	Ch	Med.
246	"	*Cistus salvifolius* L.	Ch	Med.
247	"	*Fumana arabica* (L.) Spach.	Ch	Med.
248	"	*Fumana laevipes* (L.) Spach.	Ch	Med.
249	"	*Fumana themifolia* (L.) Spach ex Webb.	Ch	Med.
250	"	*Helianthemum hirtum* L	Ch	Med.
251	"	*Helianthemum kahiricum* Delile.	Ch	Med.
252	"	*Helianthemum ledifolium* L. Mill	Th	Med.
253	"	*Helianthemum lippii (*L). Dum.	Ch	Med.
254	"	*Helianthemum salicifolium* (L.) Mille,r	Th	Med./ Ir-Tu./ Eur-Si.
255	"	*Helianthemum stipulatum* Forsk.	Ch	Med.
256	"	*Helianthemum virgatum* (Desf). Pers.	Ch	Med.
257	"	*Tuberaria guttata* (L.) Fourr.	Th	Med./ Eur-Si.
258	Convolvulaceae	*Convolvulus altheoides* L.	Th	Med.
259	"	*Convolvulus arvensis* L.	Geo	Plu.
260	"	*Convolvulus dorycnium* L.	H	Med.
261	"	*Convolvulus oleifolius* Desr. in Lam.	Ch	Med.
262	"	*Convolvulus siculus* L.	Th	Med.
263	"	*Convolvulus supinus* Coss.	Th	Med.
264	Coridaceae	*Coris monspeliensis* L.	Th	Med.
265	Crassulaceae	*Crassula alata* (Viv) Berg.	Th	Med./ Ir-Tu.
266	"	*Sedum album* L	Th	Med./ Ir-Tu.
267	"	*Sedum sediforme* (Jacq.) Pau	H	Med.
268	"	*Umbilicus horizontalis* (Guss.) DC.	H	Med.
269	"	*Umbilicus rupestris* Salisb	H	Med.
270	Cucurbitaceae	*Bryonia cretica* L.	H	Med./ Ir-Tu.
271	"	*Citrullus colocynthis* (L.) Schrad.	H	Sah-Ar.
272	Cuscutaceae	*Cuscuta planiflora* Ten.	Th	Med./ Ir-Tu.
273	Dipsacaceae	*Scabiosa arenaria* Forsk.	Th	Med.
274	"	*Scabiosa monspeliensis* Jacq.	Th	Med.
275	Euphorbiaceae	*Chrozophora obliqua* (Vahl.) Juss. Ex Spreng	Th	Med./ Ir-Tu.
276	"	*Crozophora tinctoria* (L.) Juss.	Th	Med./ Ir-Tu.
277	"	*Euphorbia bivonae* Steud.	Ch	Med.
278	"	*Euphorbia exigua* L.	Th	Med./ Ir-Tu.
279	"	*Euphorbia falcata* L.	Th	Trop.

280	"	*Euphorbia helioscopia* L.	Th	Plu.
281	"	*Euphorbia parvula* Delile.	Th	Med.
282	"	*Euphorbia peplus* L.	Th	Sud.
283	"	*Euphorbia terracina* L	H	Med./ Eur-Si.
284	"	*Mercurialis annua* L.	Th	Med.
285	"	*Ricinus communis* L.	NP	Sud.
286	Fabaceae	*Anagyris foetida* L	Th	Med.
287	"	*Anthyllis tetraphylla* L.	Th	Med.
288	"	*Anthyllis vulneraria* L.	Th	Med.
289	"	*Argyrolobium uniflorum (*Decne.) Jaub. & Spach	Ch	Med.
290	"	*Astragalus asterias* Stev. ex Ledeb.	Th	Med./ Ir-Tu.
291	"	*Astragalus caprinus* L	H	Med./ Ir-Tu.
292	"	*Astragalus hamosus* L.	Th	Med.
293	"	*Astragalus sinaicus* Boiss	Th	Med./ Ir-Tu.
294	"	*Astragalus stella* Gouan.	Th	Med.
295	"	*Astragalus tribuloides* Del.	Th	Med./ Ir-Tu.
296	"	*Calicotome villosa* (Poir.) Link.	NP	Med.
297	"	*Coronilla repanda* (Poir.) Guss	Th	Med.
298	"	*Coronilla scorpioides* L. & Koch.	Th	Med.
299	"	*Ebenus pinnata* Ait. & Hort.	H	Med.
300	"	*Genista acanthocalda* DC.	NP	Med.
301	"	*Genista microcephala* Coss. & Dur.	NP	Med.
302	"	*Hedysarum spinosissimum* L.	Th	Med.
303	"	*Hippocrepis bicontorta* Lois.	Th	Sah-Ar.
304	"	*Hippocrepis ciliata* Willd	Th	Med.
305	"	*Hippocrepis multisiliquosa* L.	Th	Med.
306	"	*Hippocrepis scabra* DC	H	Med.
307	"	*Hymenocarpos circinatus* (L.) Savi.	Th	Med./ Ir-Tu.
308	"	*Lathyrus cicera* L.	Th	Med./ Ir-Tu.
309	"	*Lotus cytisoides* L.	H	Med.
310	"	*Lotus edulis* L.	Th	Med.
311	"	*Lotus halophilus* Boiss.	Th	Med.
312	"	*Lotus ornithopodioides* L.	Th	Med.
313	"	*Medicago coronata* (L.) Bart.	Th	Med.
314	"	*Medicago laciniata* L.	Th	Sah-Ar.
315	"	*Medicago littoralis* Rohde. ex Lois.	Th	Med.
316	"	*Medicago minima* (L.) Bart.	Th	Med./ Ir-Tu.
317	"	*Medicago polymorpha* L.	Th	Med./ Ir-Tu.
318	"	*Medicago sativa* L.	H	Med.
319	"	*Medicago tornata* (L.) Mill.	Th	Med.
320	"	*Melilotus indicus* (L.) All.	Th	Med.
321	"	*Melilotus sulcatus* Desf.	Th	Med.
322	"	*Ononis natrix* L.	Ch	Med.
323	"	*Ononis ornithopodioides* L.	Th	Med.
324	"	*Ononis reclinata* L	Th	Med./ Ir-Tu.
325	"	*Ononis serrata* Forsk.	Th	Med./ Ir-Tu.
326	"	*Ononis sicula* Guss.	Th	Med./ Ir-Tu.
327	"	*Ononis viscosa* L.	Th	Med.
328	"	*Psoralea bituminosa* L.	H	Med.
329	"	*Retama raetam* (Forsk.) Webb	NP	Sah-Ar.
330	"	*Scorpiurs muricatus* L.	Th	Med.
331	"	*Scorpiurs subbvillosus* (L.) Lam	Th	Med.
332	"	*Spartidium saharae* (Coss. et Dur.) Pomel.	NP	Sah-Ar.
333	"	*Tetragonolobus purpureus* Moench	Th	Med.
334	"	*Trifolium campestre* Schreb.	Th	Med.
335	"	*Trifolium cherleri* L.	Th	Med.
336	"	*Trifolium scabrum* L.	Th	Med.
337	"	*Trifolium stellatum* L.	Th	Med.
338	"	*Trifolium tomentosum* L.	Th	Med./ Ir-Tu./ Eur-Si.
339	"	*Trigonella stellata* Forsk.	Th	Med./ Ir-Tu.

340	"	*Vicia laxiflora* Brot.	Th	Med.
341	"	*Vicia lutea* L.	Th	Med.
342	"	*Vicia monantha* Retz.	Th	Med.
343	"	*Vicia sativa* L.	Th	Med./ Ir-Tu./ Eur-Si..
344	"	*Vicia villosa* Roth.	Th	Med./ Ir-Tu./ Eur-Si.
345	Fumariaceae	*Fumaria gaillardotii* Boiss	Th	Med.
346	"	*Fumaria parviflora* Lam.	Th	Med./ Eur-Si.
347	"	*Fumaria vaillantii* Lois.	Th	Plu.
348	Gentianaceae	*Centaurium pulchellum* (Swartz.) Druce.	Th	Med.
349	Geraniaceae	*Erodium arborescens* Desf.	H	Sah-Ar.
350	"	*Erodium cicutarium* L	Th	Med.
351	"	*Erodium glaucophyllum* (L.) L 'Herit.	H	Sah-Ar.
352	"	*Erodium hirtum* (Frorsk.) Will.	Th	Sah-Ar.
353	"	*Erodium laciniatum* (Cav.) Willd.	Th	Med.
354	"	*Erodium malacoides* (L.) L Her.	Th	Med./ Ir-Tu.
355	"	*Erodium moschatum* (L.) L Her.	Th	Med.
356	"	*Geranium molle* L.	Th	Med./ Eur-Si
357	Globulariaceae	*Globularia alypum* L.	Ch	Med.
358	Hypecoaceae	*Hypecoum geslini* Coss. et Kral.	Th	Med.
359	"	*Hypecoum procumbens* L.	Th	Med.
361	Illcebraceae	*Gymnocarpos decander* Forsk.	Ch	Med./ Ir-Tu.
360	"	*Herniaria cinerea* DC.	Th	Med./ Ir-Tu.
362	"	*Herniaria fontanesii* J.Gay in Duch.	H	Med.
363	"	*Herniaria hemistemon* J.Gay in Duch.	H	Med./ Ir-Tu.
364	"	*Paronychia arabica* (L.) DC.	Th	Med./ Ir-Tu.
365	"	*Paronychia capitata* (L.) Lamk.	H	Med.
366	Lamiaceae	*Ajuga iva* (L.) Schreber	H	Med./ Ir-Tu.
367	"	*Lamium amplexicaule* L.	Th	Med.
368	"	*Lavandula multifida* L.	Ch	Med./ Ir-Tu.
369	"	*Marrubium alysson* L.	H	Med.
370	"	*Marrubium vulgare* L.	H	Med./ Ir-Tu.
371	"	*Micromeria nervosa* (Desf.) Benth.	Ch	Med.
372	"	*Prasium majus* L.	NP	Med.
373	"	*Rosmarinus officinalis* L.	Ch	Med.
374	"	*Salvia lanigera* Poir.	Th	Med./ Ir-Tu.
375	"	*Salvia verbenaca* L.	Th	Med./ Ir-Tu./ Eur-Si.
376	"	*Sideritis montana* L.	Th	Med./ Ir-Tu.
377	"	*Teucrium polium* L.	Ch	Med./ Ir-Tu./ Eur-Si.
378	"	*Thymus algeriensis* Boiss	Ch	Med.
379	"	*Thymus capitatus* (L.) Hoffm. & Link	Ch	Med.
380	Linaceae	*Linum bienne* Mill.	Th	Med./ Ir-Tu.
381	"	*Linum strictum* L.	Th	Med.
382	"	*Linum trigynum* L.	Th	Med./ Ir-Tu./ Eur-Si.
383	"	*Linum usitatissimum* L	Th	Med.
384	Malvaceae	*Malva aegyptia* L	Th	Sah-Ar.
385	"	*Malva parviflora* L.	Th	Med./ Eur-Si.
386	"	*Malva sylvestris* L.	H	Med./ Ir-Tu.
387	Mimosaceae	*Acacia cyanophylla* Lindley.	Ph	Ir-Tu.
388	"	*Acacia karroo* Hayne	Ph	Plu.
389	"	*Acacia nolitica* (L.) Delile.	Ph	Plu.
390	Moraceae	*Ficus carica* L.	Ph	Med.
391	Myrtaceae	*Eucalyptus cosmophylla* F. muell.	Ph	Australia.
392	"	*Eucalyptus gomphocephala* DC.	Ph	Australia.
393	"	*Eucalyptus leucoxylon* F. Muell. In Trans.	Ph	Australia.
394	Oleaceae	*Olea europaea* L.	Ph	Med.
395	Oxaidaceae	*Oxalis articulata* S avigny	Geo	Plu.
396	"	*Oxalis pes-caprae* L.	Geo	Plu.
397	Papaveraceae	*Papaver hybridum* L	Th	Med.
398	"	*Papaver rhoeas* L.	Th	Med./ Ir-Tu.
399	Plantaginaceae	*Plantago afra* L	Th	Med./ Ir-Tu.

400	"	*Plantago albicans* L.	H	Med./ Ir-Tu.
401	"	*Plantago amplexicaulis* Cav.	Th	Med./ Ir-Tu.
402	"	*Plantago arenaria* Walds.t & Kit.	Th	Med./ Ir-Tu./ Eur-Si.
403	"	*Plantago coronopus* L	Th	Med./ Ir-Tu.
404	"	*Plantago lagopus* L	Th	Med./ Ir-Tu./ Eur-Si.
405	"	*Plantago lanceolata* L	H	Med./ Ir-Tu./ Sah-Ar.
406	"	*Plantago notata* Lag	Th	Med./ Ir-Tu.
407	"	*Plantago ovata* Forskal	H	Med./ Ir-Tu.
408	"	*Plantago phaeostoma* Boiss.	Th	Med.
409	Plumbaginaceae	*Limonium echioides*L.Mill.	Th	Med.
410	"	*Limonium thouinii* Viv.	Th	Sah-Ar.
411	Polygonaceae	*Emex spinosus* L	Th	Med./ Ir-Tu.
412	"	*Polygonum equisetiforme* Sibth.	Ch	Plu.
413	"	*Rumex bucephalophorus* L.	Th	Med.
414	"	*Rumex tingitanus* L.	Th	Ir-Tu.
415	"	*Rumex vesicarius* L.	Th	Sah-Ar.
416	Portulaceae	*Portulaca oleracea*	Th	Med./ Ir-Tu./ Eur-Si.
417	Primulaceae	*Anagallis arvensis* L.	Th	Med./ Ir-Tu./ Eur-Si.
418	"	*Anagallis monelli* L.	Th	Med.
419	"	*Asterolinon linum- stellatum* L. Duby in DC.	Th	Med.
420	Ranunculaceae	*Adonins dentata* Delile.	Th	Med./ Ir-Tu.
421	"	*Adonis aestivalis* L.	Th	Med./ Ir-Tu.
422	"	*Adonis microcarpa* DC	Th	Med./ Ir-Tu.
423	"	*Delphinium halteratum* Sibth. & Smith.	Th	Med.
424	"	*Nigella arvensis* L.	Th	Med./ Ir-Tu.
425	"	*Nigella damascena* L.	Th	Med./ Ir-Tu.
426	"	*Ranunculus asiaticus* L.	Th	Med.
427	"	*Ranunculus bullatus* L.	Th	Med.
428	Resedaceae	*Reseda alba* L**.**	Th	Med./ Ir-Tu./ Eur-Si.
429	Rhamnaceae	*Rhamnus alaternus* L.	NP	Med.
430	"	*Ziziphus lotus* (L.) Lam.	NP	Med./ Sud.
431	Rosaceae	*Sanguisorba minor* Scop.	Th	Med.
432	Rubiaceae	*Callipeltis cucullaris* L.	Th	Med./ Ir-Tu.
433	"	*Crucianella aegyptiaca* L.	Th	Med.
434	"	*Galium aparine* L.	Th	Med.
435	"	*Galium murale* L.	Th	Med.
436	"	*Galium setaceum* Lam.	Th	Med.
437	"	*Galium tricornutum* Dandy.	Th	Med.
438	"	*Galium verrucosum* Huds.	Th	Med.
439	"	*Sheradia arvensis* L.	Th	Med./ Ir-Tu.
440	"	*Valantia hispida* L.	Th	Med.
441	"	*Valantia lanata* Delile.	Th	Med.
442	Rutaceae	*Ruta chalepensis* L.	Th	Ir-Tu./ Sah-Ar.
443	Santalaceae	*Thesium humile* Vahl	Th	Med.
444	Sapindaceae	*Dodonea viscosa* (L.) Jacq.	NP	Plu.
445	Scrophulariaceae	*Kickxia egyptiaca* L	H	Med./ Sah-Ar.
446	"	*Linaria simplex* Desf.	Th	Med./ Ir-Tu./ Eur-Si.
447	"	*Linaria tarhunensis* Pamp.	Th	Med.
448	"	*Linaria tenuis* (Viv.) Sperng.	Th	Med./ Sah-Ar.
449	"	*Misopates orontium* L. & Rafin.	Th	Med.
450	"	*Scrophularia arguta* Ait.	Th	Med./ Sah-Ar.
451	Solanaceae	*Lycium europaeum* L.	NP	Med.
452	"	*Lycium shawii* Roemer & Schultes.	NP	Med./ Ir-Tu.
453	"	*Lycium showeinfurthii* Dammer in Bot.	NP	Med.
454	"	*Nicotiana glauca* R. C. Graham.	NP	Plu.
455	"	*Solanum nigrum* L.	Th	Cos.
456	Tamaricaceae	*Tamarix aphylla* Graham.	NP	Sud./ Sah-Ar.
457	Urticaceae	*Perietaria mauritanica* Durieu.	Th	Med.
458	"	*Urtica pilulifera* L.	Th	Med./ Ir-Tu./ Eur-Si
459	"	*Urtica urens* L.	Th	Med./ Ir-Tu.

460	Valerianaceae	*Centranthus calcitrapa* (L.) Dufrense.	Th	Med.
461	"	*Valerianella chlorodonata* Cosson .	Th	Med.
462	"	*Valerianella discoidea* (L.) Loisel.	Th	Med./ Ir-Tu.
463	"	*Valerianella petrovichii* Asherson.	Th	Med.
464	Verbinaceae	*Lantana camara* L.	NP	Med./ Ir-Tu./ Trop.
465	Zygophyllaceae	*Fagonia cretica* L.	H	Med.
466	"	*Fagonia tenuifolia* Steud. & Hochst.	H	Sah-Ar.
467	"	*Peganum harmala* L.	Th	Med./ Ir-Tu.
468	"	*Tribulus terristris* L.	Th	Plu.

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Citation: Mohammed H Mahklouf *et al.* (2020). Floristic Study and Species Diverisy of Msallata-Garaboulli Province in Libya. J. of Advanced Botany and Zoology, V7I3.04. DOI: 10.5281/zenodo.3752339.