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Floristic composition, chorotypes and life form of the Musallata, natural reserve, Libya

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Abstract

The flora of Masalata Natural Reserve (MNR) in the north-Western section of Libya, 90 km east of the city of Tripoli was surveyed in terms of life forms and phytogeography. Distribution and abundance values of the recorded species were determined. A total 445 of flowering plants are identified, they are distributed in 249 genera and belonging 64 Families. Annuals are predominated life form (60.9%), while parasites are the lowest (0.22%). The mono-regional Mediterranean species constitute 62.02% of the other flora. Species which are primarily Mediterranean but in some cases bi-regional with 30.78% and pluri-regional account for 14.38%.

Keywords: Life forms, AL- shaafin reserve, vegetation and chorotypes

Introduction

Some arguments about the establishment of nature reserves and national parks in the world began about 140 years ago, when the United States of America created the first national park, Park «Yellowstone» in the state of «Wyoming» in 1872, but historical sources indicate that the idea of nature reserves in ancient history, thousands of years ago, some land in some countries were considered "sacred" areas, there were also sacred mountains have a special history and charm in both Australia and Europe, and in 252 BC. M, the Emperor of India «Asoka» passed a law to protect animals and fish.

In the historical information, also, during the Roman rule of Lebanon, about two thousand years ago, the Roman Emperor «Adrian», found that a large part of the forests of Lebanon had been cut off, and he determined the area of what remains with carved stones, declaring the ownership of the forest for the protection of the empire.

In Europe, the English King William I in 1084 ordered the preparation of a comprehensive survey of land, forests, fish areas, agricultural areas, fishing reserves and productive resources of the Kingdom to develop appropriate plans for development and management (Abaad Magazine, 1998) ^[1].

In the Arab world, protectorates have long been known, with each group of people or tribes protecting the water springs, pastures and trees around the tribe to graze their livestock and drink from the protected waters.

The various countries of the world resorted to the establishment of nature reserves of all kinds to reduce the risk of environmental degradation, and the disappearance of plant and animal species, where the number of protected areas in the world more than 35,000 thirty-five thousand reserves, covering more than 8% of the area of land, about 13.8 million Table (1) Arab countries have moved towards establishing nature reserves, but they are still few in need, and the names of the reserves vary from one Arab country to another. Among the designations adopted in the Arab countries are restricted areas or national sheds, desert reserves, wetland reserves, and pastoral fences. National or natural reserves Protected areas, wildlife reserves, etc. (Ani and Mufti, 2002) ^[6]

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Table 1: Protected Areas by International Regions.

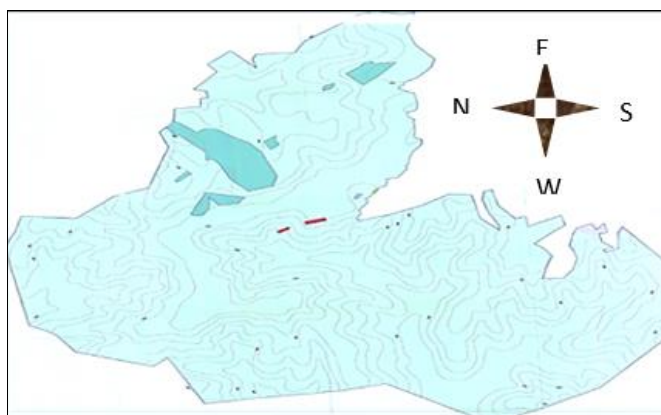
Region	Number	Total area (million hectares)
South and East Asia and the Pacific	7250	300
Europe and Central Asia	16400	145
Africa	3000	240
West Asia	67	86
North America	5500	250
Latin America	2850	360
Total	35067	1381

Libya is characterized by a vast land area of 1.670.000 km², which is predominantly desert, located between longitudes 9.58-25 east and latitude 20-33 north, and the number of plant species in Libya about 1800-2000 plant species, distributed over more 800 genera, belonging to more than 147 families (Jafri & El - Gadi, 1987) ^[16], a relatively small considered number compared to the vast area, and most of this area deserts are poor in vegetation, which calls for the preservation of what exists and work to maintain by Protected areas.

It is worth mentioning that nature reserves are only a natural extension to protect the environment and natural resources. The aim of establishing nature reserves is to protect animal and plant resources not only for the present but for the benefit of the generations of the coming future. On the local animal and plant genetic species that have scientific and economic dimensions, they serve as a laboratory and scientific research center in the field of conservation of endangered species, and work on their development and conservation with a view to natural rebalancing. An economic dimension lies in confronting desertification and halting its creeping. In addition, the protection of animal and plant life in the reserves is a unique and unique place for tourist attraction and support for the national economy (Daabis, 2002) ^[8].

When establishing a reserve, a list of wild flora and fauna must be available in order to the management of the reserve and its staff to know the components of the reserve, so that it can be monitored and assessed over the years. Life in order to be a reference for researchers and interested in the study of plants in the area of its obelisks in later studies, where the MNR with its obelisks was established by resolution No. 346/28 of 1998.

The aim of this study is to provide a description of the floristic composition and life form spectrum, and an analysis of the distribution pattern of plant species in MNR in the western Mediterranean coast of Libya. Such data are critically important for conservation planning since the area is being rapidly developed by urbanization.

**Fig 1:** Map showing the study area (El Werfalyi and Hassan, 2018) ^[10]

Materials and methods

Area of the Study

The area of Masalata is located in northwestern Libya, at the end of the north-eastern edge of the Nafusa Heights, between longitudes 49 13o - 14 14o east and two latitudes 25 32o - 36 32o north, bordered north by Al-Khums area, south of Tarhuna region while extending westward to Qara Bolly area. The area is about 15 km away from the Mediterranean coast. The area of Maslata area is estimated at 90 thousand hectares. Masalata Natural Reserve is located in the western part of the region, 20 km northwest of the central Kasbaht, and about 90 km east of Tripoli. The terrain, punctuated by a number of valleys, estimated area of about 500 hectares T almost as part exploiter. (Public Authority for Environment, 2005) ^[13].

Methods of the studies

The majority of the territory of Libya, which dominates most of the northern part of the African continent, is subject to the Mediterranean and desert climate, the latter may prevail in some seasons, which increases the impact of the desert climate (Sharaf, 1996) ^[24], the study area is located within the transition zone between the Mediterranean climate prevailing in the strip The coastal and northern highlands climate is generally mild in winter, hot and dry in summer, and winter rains.

The soil strength of the study area is sandy (sandy loam) with about 25-30% of the area and about 70-75% rock stone PH soil ranges from 8.3 to 8.6. The total soluble salt content of soil extract ranges from very low organic matter content in the study area. Thus, the soil in the study area is characterized by its poor organic matter.

Results and Discussion

All plant species collected from the study area (appendix) were classified using Raunkairs classification analysis, whose method is based on the height of the growing peaks and buds from the surface (Raunkairs 1934) ^[22]. Its natural obelisks are confined to six forms (Table 1) that differ in their proportions from one form to another. The dominance of annuals (Fig. 2) is as follows:

Table 1: Number of plant species and their percentage in the different life forms of the MNR. TH= Therophytes, CH= HC= GH= PH= PA=

Life form	N of Species	Percentage
TH	271	60.899
CH	72	16.180
HC	54	12.135
GH	30	6.741
PH	17	3.820
PA	1	0.224
Total	445	100

1. Therophytes

Therophytes represent the largest group in the reserve and represent the sovereignty is kept during inappropriate conditions in the form of a seed while active and complete its life cycle in the appropriate wet season, this section is the largest section in the study area, which represented 60.899%, and the most important annual plants are: *Linum strictum*, *Lagurus ovatus*, *Scilla peruviana*,

2. Chamaephytes

It consists of a large group of shrubs and perennial grasses and the types of this category have perennial shoots growing on air parts close to the surface of the earth (the length of plants less than 2 m. The percentage represented 16.180%, the

second category represented the study area, which are plants under the dendritic wood or semi-wood and most of them are existing and these plants: *Crepis libyaca*, *Thymus capitatus*, *Stipa tenacissima*.

3. Hemicryptophytes

This group is prostrate shrubs or herbaceous plants that dieback each year, the third largest group collected from the study area 12.135% Such as *Carduncellus eriocephalus*, *Carduncellus pinnatus*, *Carlina involucrata*.

4. Geophytes

Plants of this category are characterized by their production of rhizomes or bulbs and are represented by 6.741%. These species are *Asphodelus microcarpus*, *Urginea maritima*, *Allium longanum*.

5. Phanerophytes

Represented by plants more than 15 meters, including pine and *Acacia*, and the plant species in this category have perennial shoots growing on the aerial parts and accounted for 3.82% of the total plants in MNR and represents the fifth largest group collected from the study area, which is large-sized plants and is represented in trees and shrubs The most important are species are *Pinus halepensis*, *Acacia cyanophylla*, *Olea europaea*.

6. Parasites

A parasite is an organism that lives on or in a host and gets its food from or at the expense of its host. The percentage of 0.22%. The most common species is *Cuscuta planiflora*.

The life forms in the study area were compared with some previous studies. All of them agree that the prevalence of the yearly plants Therophytes with a slight difference in percentages between them, where the yearbooks in the study (Salem, 2008) (55%), and in the study (Al-Qamati, 2004) ^[5] (54.3%), in the study (Almslati, 2013) (53.71%). In this study the rate of annuals (60.899%), also we found that plant life depends mainly on rain water, where the valleys in the region remain without water and dry almost two-thirds of the year. Chamaephytes represent 16.180% in the study area, while in (Al-Qamati, 2004) ^[5], 9.5%. This helps to increase the prevalence of annual fire - resistant plants, and its consistent with the study of (Salem, 2008) ^[15].

Chorotype analysis

The phytogeographic analysis of the recorded plant species are shown in (Table 2) and (Figure 3). The recorded taxa are either mono-regional (62.02%), Bi-regional (30.78%), Pluri-regional (7.19%).

Table 2: Number of plant species and their percentage in the different Chorotypes of the Msellata Natural Reserve.

Chorotype	N of Species	Percentage
Mono-regional		
MD	195	43.82
SA	45	10.11
IT	9	2.02
AM	1	0.22
ES	11	2.47
PL	13	2.92
AU	2	0.45
Total	276	62.02
Bi-regional		
MD – IT	66	14.83
MD – SA	20	4.49
MD – ES	31	6.97
MD – SU	1	0.22
IT – SA	14	3.15
ES – IT	1	0.22
SU - SA	3	0.67
ES - SA	1	0.22
Total	137	30.78
Pluri-regional		
MD – ES – IT	29	6.52
MD – IT - SA	3	0.67
Total	32	7.19
TOTAL	91	14.38

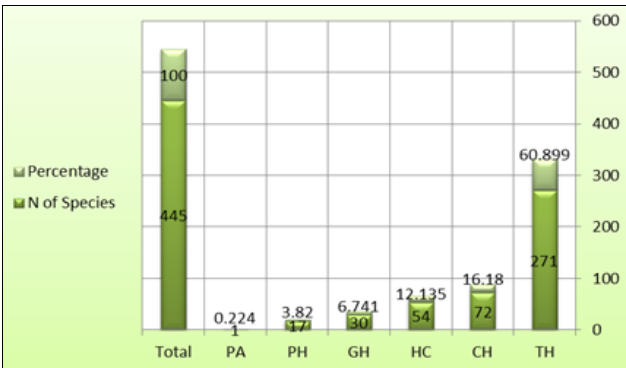


Fig 2: Life form spectrum of the species recorded of the Msellata Natural Reserve. The life forms are: PH: phanerophytes, CH: chamaephytes, HC: hemicryptophytes, GH: geophytes-helophytes, TH: Therphytes and PA: parasites.

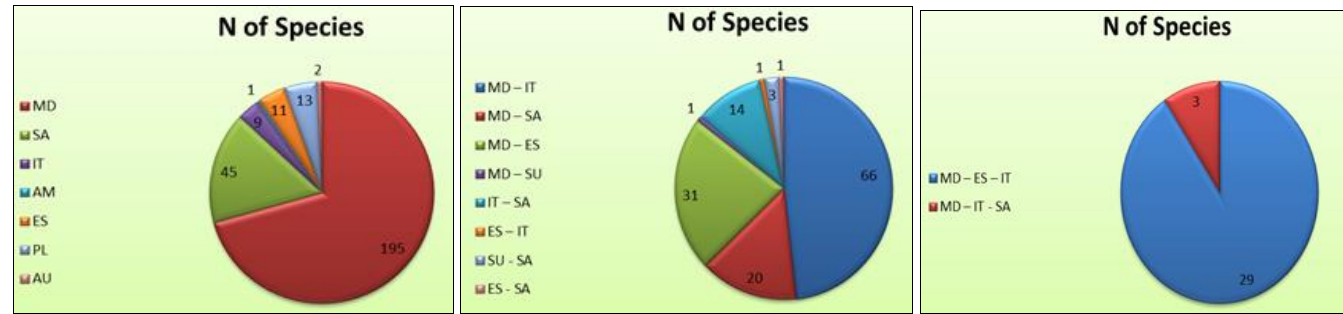


Fig 3: Proportionate representation of chorotypes Msellata Natural Reserve. AM: American, ES: Euro-Sibarian, IT: Irano-Turanian, MD: Mediterranean, SA: Saharo-Arabian, AM: Pluriregional, AU: Australian and TR: Tropical.

Libya has also received numerous studies in the past, including vegetation, and the environment in many areas, which are contained in the book (Duraand & Barratte, 1910) ^[9] entitled Introduction to Libyan plants.

Also, many studies have been conducted in which many plant species and their life forms were recorded in the area of Masalata such as: (Pampanini, 1914; Corti, 1942; and Siddiqi *et al*, 1986) [20, 7, 25].

(Ali & Jafri, 1977) [16]. He studied the Mesayid area, (EL-Gadi, 1978) [11] He studied the Al-Qasabat, (Enayet & EL-Gadi, 1985) [11], studied the Quraym and Sindara region, (Erteeb & Sherif, 1985) [14] Studied the Zafaraniya Wadi, (Alavi, 1983; Keith, 1965) [2] studied the Al-Qasabat, (Labani & EL-Gadi, 1980) [11] He studied Hafs, (Jafri, 1980) [17] He studied the Al-amoud area, (Qaiser, 1984) [21] He studied the Al-Qasabat and (Saad, 2013) [23] A taxonomic study of the components of vegetation cover in Wadi Ghadou in the Jaffara plain.

Recommendations

A fence must be constructed for the reserve, and specific areas and areas for visitors should be defined. The rest of the area should be used as a reserve, which and must be entered

only by specialists in the conduct of scientific studies.

The management of the reserve should follow up and control the rare plant species, in order to protect them from extinction or any other unintended work, by preparing local and external training courses for the staff of the reserve, to raise their efficiency and scientific expertise.

The fire extinguishing unit must be provided in the reserve, so that its personnel can control fires caused by lightning, or fires resulting from any acts.

Recommend taxonomic studies of the reserve to preserve rare or threatened species .Prohibit any activities that may destroy or damage the natural environment or affect its aesthetic level in the protected area.

Waste of all kinds, in the protected area or surrounding areas, must not be discharged.

Preventing the construction of roads in the reserve in all its forms and for any reason .Prevent logging or grazing in any way.

Appendix: Floristic list of plant species recorded of Msellata Natural Reserve, Libya.

Family	Species	Life form	Chorotype
Pteridophytes			
Sinopteridaceae	<i>Cheilanthes vellea</i> Ait.	HC	MD
Gymnospermae			
Cupressaceae	<i>Juniperus phoenicea</i> L.	PH	MD
Ephedraceae	<i>Ephedra alata</i> Decne.	CH	SA
	<i>Ephedra altissima</i> Desf.	CH	SA
Pinaceae	<i>Pinus halepensis</i> Mill.	PH	MD
Angiospermae			
Dicotyledones			
Araceae	<i>Arisarum vulgare</i> Targ.	GH	MD
Anacardiaceae	<i>Pistacia lentiscus</i> L.	PH	MD
	<i>Rhus tripartita</i> Ucria.	CH	IT
Apiaceae	<i>Bunium fontanesii</i> Pers.	GH	MD
	<i>Bupleurum gibraltarium</i> Lam.	TH	MD. ES. IT
	<i>Bupleurum lancifolium</i> Hornem	TH	MD. IT
	<i>Bupleurum odontites</i> L.	TH	MD
	<i>Bupleurum semicompositum</i> L.	TH	MD. IT. SA
	<i>Bupleurum trichopodium</i> Boiss.	TH	MD
	<i>Daucus capillifolius</i> Gilli.	TH	MD
	<i>Daucus jordanicus</i> Bost.	TH	MD. SA
	<i>Daucus sahariensis</i> Murb.	TH	MD. IT
	<i>Daucus syrticus</i> Nurb.	TH	MD. ES
	<i>Ferula tingitana</i> L.	CH	MD
	<i>Pimpinella peregrina</i> L.	CH	MD
	<i>Scandix australis</i> L.	TH	MD. ES
	<i>Scandix pecten-veneris</i> L.	TH	MD. ES. IT
	<i>Torilis leptophylla</i> L.	TH	MD. IT
	<i>Torilis nodosa</i> L.	TH	MD. ES. IT
	<i>Torilis tenella</i> Del.	TH	MD. IT
Aizoaceae	<i>Aizoon hispanicum</i> L.	TH	SA
	<i>Mesembryanthemum crystallinum</i> L.	TH	MD. ES
Asclepiadaceae	<i>Caralluma europaea</i> Guss.	CH	MD
	<i>Periploca angustifolia</i> Labill.	CH	IT
Asteraceae	<i>Amberboa libyca</i> Viv.	CH	SA
	<i>Amberboa lippii</i> DC.	CH	SA
	<i>Anacyclus clavatus</i> Desf.	TH	MD
	<i>Anacyclus monanthos</i> L.	TH	MD
	<i>Andryala integrifolia</i> L.	HC	MD
	<i>Anthemis secundiramea</i> Biv.	TH	MD. SA
	<i>Asteriscus pygmaeus</i> DC.	TH	SA
	<i>Atractylis cancellata</i> L.	TH	MD
	<i>Atractylis delicatula</i> Batt.	TH	MD
	<i>Atractylis serratuloides</i> Sieb.	CH	SA
	<i>Bombycilaena discolor</i> Pers.	TH	MD
	<i>Calendula arvensis</i> L.	TH	MD. IT
	<i>Carduncellus eriocephalus</i> Boiss.	HC	SA

	<i>Carduncellus pinnatus</i> Desf.	HC	MD
	<i>Carlina involucrata</i> Boint.	HC	MD
	<i>Carlina sicula</i> Ten.	TH	MD
	<i>Carthamus lanatus</i> L.	TH	MD. ES
	<i>Camilla aurea</i> Loeffl.	HC	MD
	<i>Centaurea alexandrina</i> Delill.	TH	MD
	<i>Centaurea dimorpha</i> Viv.	HC	MD
	<i>Centaurea glomerata</i> Vahl.	HC	MD
	<i>Centaurea maroccana</i> Ball.	HC	MD. IT
	<i>Centaurea melitensis</i> L.	HC	IT
	<i>Centaurea sphaerocephala</i> L.	HC	MD
	<i>Centaurea africana</i> Lam.	TH	MD
	<i>Chrysanthemum carinatum</i> Sch.	TH	MD
	<i>Chrysanthemum coronarium</i> L.	TH	MD
	<i>Chrysanthemum segetum</i> L.	TH	MD
	<i>Cichorium pumilum</i> Jacq.	TH	MD. IT
	<i>Conyza aegyptiaca</i> L.	TH	MD. SA
	<i>Conyza bonariensis</i> L.	TH	MD. SA
	<i>Conyza Canadensis</i> L.	TH	AM
	<i>Crepis libyaca</i> Pamp.	CH	SA
	<i>Crepis senecioides</i> Delile.	TH	SA
	<i>Crepis vesicaria</i> L.	HC	ES
	<i>Cynara cardunculus</i> L.	HC	MD
	<i>Crupina crupinastrum</i> Moris.	TH	MD. IT
	<i>Crupina vulgaris</i> Cass.	TH	MD. IT
	<i>Echinops galalensis</i> Schweinf.	HC	MD
	<i>Echinops spinosissimus</i> Freyn.	HC	IT
	<i>Filago desertorum</i> Pomel.	TH	IT. SA
	<i>Filago pyramidata</i> L.	TH	MD
	<i>Hedypnois cretica</i> L.	TH	MD
	<i>Hedypnois rhagadioloides</i> L.	TH	MD
	<i>Helichrysum stoechas</i> L.	CH	MD
	<i>Helianthus multiflorus</i> L.	PH	MD
	<i>Hyoseris radiata</i> L.	HC	MD
	<i>Hyoseris scabra</i> L.	TH	MD
	<i>Hypochaeris achyrophorus</i> L.	TH	MD. ES. IT
	<i>Hypochaeris glabra</i> L.	TH	MD. ES
	<i>Koelpinia linearis</i> Pallas.	TH	ES. IT
	<i>Lactuca sativa</i> L.	HC	MD. IT
	<i>Lactuca serriola</i> L.	TH	MD. ES. IT
	<i>Launaea nudicaulis</i> L.	HC	IT. SA
	<i>Launaea procumbens</i> Roxb.	TH	MD
	<i>Launaea resedifolia</i> L.	CH	MD
	<i>Leontodon simplex</i> Viv.	TH	MD. ES
	<i>Leontodon hispidulum</i> Delile.	HC	IT. SA
	<i>Leontodon tuberosus</i> L.	HC	MD
	<i>Nolletia chrysocomoides</i> Desf.	TH	SA
	<i>Notobasis syriaca</i> L.	TH	MD
	<i>Onopordum arenarium</i> Desf.	TH	SA
	<i>Onopordum espiniae</i> Cosson.	TH	SA
	<i>Pallenis cyrenaica</i> Alavi.	TH	MD
	<i>Pallenis spinosa</i> L.	HC	MD
	<i>Phagnalon rupestre</i> L.	CH	MD. IT
	<i>Reichardia tingitana</i> L.	TH	MD. IT
	<i>Scorzonera undulata</i> L.	TH	MD
	<i>Senecio gallicus</i> L.	TH	IT. SA
	<i>Silybum marianum</i> L.	TH	MD. IT
	<i>Sonchus asper</i> L.	TH	MD. IT
	<i>Sonchus oleraceus</i> L.	TH	MD. ES. IT
	<i>Sonchus tenerrimus</i> L.	CH	MD. ES. IT
	<i>Urospermum dalechampii</i> L.	TH	MD. IT
	<i>Urospermum picroides</i> L.	TH	MD. IT
Amaranthaceae	<i>Amaranthus retroflexus</i> L.	TH	PL
Boraginaceae	<i>Alkanna tinctoria</i> L.	HC	MD
	<i>Arnebia decumbens</i> Vent.	TH	IT. SA
	<i>Buglossoides tenuiflora</i> L.	TH	MD. IT
	<i>Cerinthe major</i> L.	TH	MD
	<i>Cynoglossum cheirifolium</i> L.	TH	SA
	<i>Cynoglossum clandestinum</i> Desf.	TH	MD

	<i>Echium angustifolium</i> Mill.	CH	MD
	<i>Echium italicum</i> L.	TH	MD
	<i>Elizaldia calycina</i> Roem.	TH	MD. SA
	<i>Heliotropium europaeum</i> L.	TH	MD. IT
	<i>Lappula spinocarpos</i> Forsk.	TH	IT. SA
	<i>Nonea micrantha</i> Boiss.	TH	MD
Brassicaceae	<i>Biscutella didyma</i> L.	TH	MD. IT
	<i>Brassica tournefortii</i> Gouan.	TH	MD. SA
	<i>Capsella bursa</i> L.	TH	PL
	<i>Cardaria draba</i> L.	HC	MD. IT
	<i>Carrichtera annua</i> L.	TH	SA
	<i>Clypeola jonthlaspi</i> L.	TH	MD. IT
	<i>Didymus aegyptius</i> L.	TH	MD
	<i>Didymus bipinnatus</i> DC.	TH	MD
	<i>Diplotaxis harra</i> Forsk.	HC	SA
	<i>Diplotaxis muralis</i> L.	TH	MD
	<i>Enarthrocarpus clavatus</i> Delile.	TH	SA
	<i>Eruca longirostris</i> Uecht.	TH	MD. IT
	<i>Eruca sativa</i> Mill.	TH	MD. IT
	<i>Erucaria microcarpa</i> Boiss.	TH	SA
	<i>Lepidium sativum</i> L.	TH	PL
	<i>Lobularia libyca</i> Viv.	TH	SA
	<i>Lobularia maritima</i> L.	CH	MD
	<i>Lonchophora kralikii</i> Pomel.	TH	MD
	<i>Matthiola longipetala</i> Vent.	TH	MD. IT
	<i>Rapistrum rugosum</i> L.	TH	MD. IT
	<i>Sinapis flexuosa</i> Poir.	TH	MD
	<i>Sinapis pubescens</i> L.	TH	MD
	<i>Sisymbrium erysimoides</i> Desf.	TH	MD. SA
	<i>Sisymbrium irio</i> L.	TH	MD. IT
Caesalpiniaceae	<i>Ceratonia siliqua</i> L.	PH	MD
Capparaceae	<i>Capparis spinosa</i> L.	PH	MD
	<i>Cleome amblyocarpa</i> Barr.	TH	SU. SA
Caryophyllaceae	<i>Arenaria serpyllifolia</i> L.	TH	MD. IT
	<i>Cerastium glomeratum</i> Thuill.	TH	MD. ES. IT
	<i>Cerastium pumilum</i> Curtis.	TH	ES
	<i>Minuartia hybrida</i> Vill.	TH	MD. IT
	<i>Polycarpon tetraphyllum</i> L.	TH	MD. ES
	<i>Silene behen</i> L.	TH	MD
	<i>Silene cerastioides</i> L.	TH	MD
	<i>Silene apetala</i> Auct.	TH	MD. IT
	<i>Silene articulata</i> L.	TH	MD. IT
	<i>Silene colorata</i> Poiret.	TH	MD
	<i>Silene gallica</i> L.	TH	MD. ES
	<i>Silene tridentata</i> Desf.	TH	IT
	<i>Silene viviani</i> Steud.	TH	SA
	<i>Spergularia bocconii</i> Scheelr.	CH	MD. SA
Chenopodiaceae	<i>Atriplex halimus</i> L.	PH	PL
	<i>Chenopodium album</i> L.	TH	PL
	<i>Chenopodium ambrosioides</i> L.	TH	PL
	<i>Chenopodium murale</i> L.	TH	PL
	<i>Kochia indica</i> Wight.	TH	IT. SA
Cistaceae	<i>Cistus parviflorus</i> Lam.	CH	MD
	<i>Cistus salviifolius</i> L.	PH	MD
	<i>Fumana arabica</i> L.	CH	MD
	<i>Fumana laevipes</i> L.	CH	MD
	<i>Fumana thymifolia</i> L.	CH	MD
	<i>Helianthemum ciliatum</i> Desf.	CH	SA
	<i>Helianthemum hirtum</i> L.	CH	SA
	<i>Helianthemum kahiricum</i> Delile.	CH	SA
	<i>Helianthemum ledifolium</i> L.	TH	MD
	<i>Helianthemum stipulatum</i> Forsk.	CH	SA
	<i>Helianthemum lippii</i> L.	CH	SA .SU
	<i>Helianthemum virgatum</i> Desf.	CH	SA .SU
	<i>Tuberaria guttata</i> L.	TH	MD. ES
Convolvulaceae	<i>Convolvulus althaeoides</i> L.	HC	MD
	<i>Convolvulus arvensis</i> L.	GH	PL
	<i>Convolvulus dorycnium</i> L.	HC	MD
	<i>Convolvulus oleifolius</i> Desr.	CH	MD

	<i>Convolvulus siculus</i> L.	TH	MD
	<i>Convolvulus supinus</i> Coss.	HC	MD
Coridaceae	<i>Coris monspeliensis</i> L.	CH	MD
Cucurbitaceae	<i>Bryonia cretica</i> L.	HC	MD
	<i>Ecballium elaterium</i> L.	TH	MD. IT
Crassulaceae	<i>Crassula alata</i> Viv.	TH	MD
	<i>Sedum album</i> L.	CH	MD. ES
	<i>Sedum sediforme</i> Jacq.	CH	MD
	<i>Umbilicus horizontalis</i> Guss.	GH	MD
	<i>Umbilicus rupestris</i> Salisb.	HC	MD. IT
Cuscutaceae	<i>Cuscuta planiflora</i> Ten.	PA	MD. SA
Dipsaceae	<i>Scabiosa arenaria</i> Forskal.	TH	SA
	<i>Scabiosa monspeliensis</i> Jacq.	TH	MD
Euphorbiaceae	<i>Euphorbia exigua</i> L.	TH	MD. ES
	<i>Euphorbia falcata</i> L.	TH	MD. IT
	<i>Euphorbia helioscopia</i> L.	TH	MD. ES
	<i>Euphorbia bivenae</i> steud.	TH	MD
	<i>Euphorbia paralias</i> L.	CH	MD
	<i>Euphorbia peplus</i> L.	TH	MD. ES. IT
	<i>Euphorbia terracina</i> L.	CH	MD
Fabaceae	<i>Mercurialis annua</i> L.	TH	MD. ES
	<i>Anagyris foetida</i> L.	PH	MD. IT
	<i>Anthyllis tetraphylla</i> L.	TH	MD
	<i>Anthyllis vulneraria</i> L.	HC	MD
	<i>Argyrolobium uniflorum</i> Decne.	CH	SA
	<i>Astragalus asterias</i> Stev.	TH	MD. SA
	<i>Astragalus boeticus</i> L.	TH	MD
	<i>Astragalus caprinus</i> L.	CH	SA
	<i>Astragalus hamosus</i> L.	TH	MD
	<i>Astragalus sinicus</i> Boiss.	TH	MD
	<i>Astragalus stella</i> Gouan.	TH	MD
	<i>Astragalus tribuloides</i> Del.	TH	IT. SA
	<i>Calicotome villosa</i> Poir.	CH	MD
	<i>Coronilla repanda</i> Poir.	TH	MD
	<i>Coronilla scorpioides</i> L.	TH	MD
	<i>Ebenus pinnata</i> Ait.	TH	MD
	<i>Genista acanthoclada</i> DC.	TH	MD
	<i>Genista microcephala</i> Coss.	TH	MD
	<i>Hedysarum spinosissimum</i> L.	TH	MD
	<i>Hippocrepis ciliata</i> Willd.	TH	MD
	<i>Hippocrepis multisiliquosa</i> L.	TH	MD
	<i>Hippocrepis scabra</i> DC.	TH	MD
	<i>Hydnocarpus circnatus</i> L.	TH	MD
	<i>Lathyrus cicera</i> L.	TH	MD. ES
	<i>Lotus creticus</i> L.	CH	MD
	<i>Lotus Cytisoides</i> L.	CH	MD
	<i>Lotus edulis</i> L.	TH	MD
	<i>Lotus halophilus</i> Boiss.	TH	MD
	<i>Lotus ornithopodioides</i> L.	TH	MD
	<i>Lotus suaveolens</i> Pers.	TH	MD
	<i>Medicago minima</i> L.	TH	MD. ES
	<i>Medicago laciniata</i> L.	TH	SA
	<i>Medicago polymorpha</i> L.	TH	MD. ES. IT
	<i>Medicago secundiflora</i> Dur.	TH	MD
	<i>Medicago tornata</i> L.	TH	MD
	<i>Melilotus indicus</i> L.	TH	MD
	<i>Melilotus sulcatus</i> Desf.	TH	MD
	<i>Ononis angustissima</i> Lam.	CH	MD
	<i>Ononis natrix</i> L.	CH	MD
	<i>Ononis ornithopodioides</i> L.	TH	MD
	<i>Ononis reclinata</i> L.	TH	MD
	<i>Ononis serrata</i> Forsk.	TH	MD
	<i>Ononis sicula</i> Guss.	TH	MD
	<i>Ononis variegata</i> L.	TH	MD
	<i>Ononis viscosa</i> L.	TH	MD
	<i>Psoralea bituminosa</i> L.	HC	MD
	<i>Retama raetam</i> Forsk.	CH	MD. ES
	<i>Scorpius muricatus</i> L.	TH	MD. ES
	<i>Scorpius subvillosus</i> L.	TH	MD. ES

	<i>Tetragonolobus purpureus</i> Moench.	TH	MD. ES
	<i>Trifolium campestre</i> Schreb.	TH	MD. ES
	<i>Trifolium stellatum</i> L.	TH	MD. ES
	<i>Trifolium tomentosum</i> L.	TH	MD. ES
	<i>Trigonella stellata</i> Forsk.	TH	MD. ES
	<i>Vicia laxiflora</i> Brot.	TH	MD
	<i>Vicia lutea</i> L.	TH	MD
	<i>Vicia monantha</i> Retz.	TH	MD
	<i>Vicia sativa</i> L.	TH	MD
Fumariaceae	<i>Vicia villosa</i> Roth.	TH	MD
	<i>Fumaria gaillardotii</i> Boiss.	TH	MD. ES. IT
	<i>Fumaria parviflora</i> Lam.	TH	MD. ES. IT
Geraniaceae	<i>Fumaria vaillantii</i> Loois.	TH	MD. ES. IT
	<i>Erodium arborescens</i> Desf.	HC	SA
	<i>Erodium cicutarium</i> L.	TH	MD. ES. IT
	<i>Erodium glaucophyllum</i> L.	HC	SA
	<i>Erodium hirtum</i> L.	HC	SA
	<i>Erodium laciniatum</i> Cav.	TH	MD
	<i>Erodium moschatum</i> L.	TH	MD. IT
	<i>Geranium molle</i> L.	TH	MD. ES
	<i>Geranium robertianum</i> L.	TH	MD
Globulariaceae	<i>Globularia alypum</i> Linn.	PH	ES
Hypecoaceae	<i>Hypecoum geslini</i> Coss.	TH	SA
Illecebraceae	<i>Gymnocarpus decander</i> Forsk.	CH	SA
	<i>Herniaria cinerea</i> DC.	HC	MD. IT
	<i>Herniaria fontanesii</i> J. Gay.	HC	MD. IT
	<i>Herniaria hemistemo</i> J. Gay.	CH	SA
	<i>Paronychia argentea</i> Lam.	CH	MD
	<i>Paronychia capitata</i> L.	CH	MD
	<i>Paronychia chlorophyta</i> Murb.	CH	MD
Lamiaceae	<i>Ajuga reptans</i> L.	CH	MD
	<i>Lamium amplexicaule</i> L.	TH	MD. ES. IT
	<i>Lavandula multifida</i> L.	CH	MD. ES. IT
	<i>Marrubium vulgare</i> L.	CH	MD. IT
	<i>Micromeria nervosa</i> Desf.	CH	MD
	<i>Prasium majus</i> L.	CH	MD
	<i>Rosmarinus officinalis</i> L.	CH	ES
	<i>Salvia lanigera</i> Poir.	CH	MD. SA
	<i>Salvia verbenaca</i> L.	CH	MD
	<i>Sideritis montana</i> L.	TH	MD
	<i>Teucrium polium</i> L.	CH	MD. IT
	<i>Thymus algeriensis</i> Boiss.	CH	MD
Linaceae	<i>Thymus capitatus</i> L.	CH	MD
	<i>Linum decumbens</i> Desf.	TH	MD
	<i>Linum strictum</i> L.	TH	MD
Malvaceae	<i>Linum usitatissimum</i> L.	TH	MD
	<i>Lavatera cretica</i> L.	CH	MD
	<i>Malva aegyptia</i> L.	TH	SA
	<i>Malva parviflora</i> L.	TH	SA
Mimosaceae	<i>Malva sylvestris</i> L.	HC	SA
Moraceae	<i>Acacia cyanophylla</i> Lindley.	PH	AU
Myrtaceae	<i>Ficus carica</i> L.	PH	MD. IT
Oleaceae	<i>Eucalyptus cosmophylla</i> F. Muell.	PH	AU
Orchidaceae	<i>Olea europaea</i> L.	PH	MD
	<i>Ophrys speculum</i> Link.	GH	MD. ES
Oxalidaceae	<i>Orchis coriophora</i> Linn.	GH	MD. IT
	<i>Oxalis articulata</i> Savigny.	GH	ES
Orobanchaceae	<i>Oxalis pes-caprae</i> L.	GH	PL
Papaveraceae	<i>Orobanche coelestis</i> Boiss.	CH	MD
	<i>Glaucium flavum</i> Crantz.	HC	MD
	<i>Papaver hybridum</i> L.	TH	MD. IT
Plantaginaceae	<i>Papaver rhoeas</i> L.	TH	ES
	<i>Plantago afra</i> L.	TH	MD. IT
	<i>Plantago albicans</i> L.	TH	MD. SA
	<i>Plantago amplexicaulis</i> Car.	TH	SA
	<i>Plantago arenaria</i> Waldst.	TH	MD. ES. IT
	<i>Plantago coronopus</i> L.	HC	MD
	<i>Plantago lagopus</i> L.	TH	MD
	<i>Plantago lanceolata</i> L.	HC	MD. ES. IT

	<i>Plantago nonato</i> Lag.	TH	MD. ES. IT
	<i>Plantago ovata</i> Forskal.	TH	IT. SA
	<i>Plantago phaeostoma</i> Boiss.	TH	SA
Plumbaginaceae	<i>Limonium thouinii</i> Viv.	TH	SA
	<i>Limonium echioides</i> L.	TH	MD
Polygonaceae	<i>Calligonum azel</i> Maire.	CH	MD
	<i>Emex spinosa</i> L.	TH	MD
	<i>Polygonum equisetiforme</i> Sm.	CH	MD. IT
	<i>Rumex bucephalophorus</i> L.	TH	MD
	<i>Rumex tingitanus</i> L.	TH	IT
	<i>Rumex vesicarius</i> L.	TH	SA
Primulaceae	<i>Anagallis arvensis</i> L.	TH	MD. ES. IT
	<i>Anagallis monelli</i> L.	TH	MD. ES. IT
	<i>Asterolimon linum – stellatum</i> L.	TH	MD. IT
Ranunculaceae	<i>Adonis aestivalis</i> L.	TH	MD. ES. IT
	<i>Adonis dentata</i> L.	TH	IT. SA
	<i>Adonis microcarpa</i> DC.	TH	MD
	<i>Delphinium halteratum</i> Sibth.	TH	MD
	<i>Nigella arvensis</i> L.	TH	MD. ES. IT
	<i>Nigella damasceana</i> L.	TH	MD. ES. IT
	<i>Ranunculus asiaticus</i> L.	TH	MD
	<i>Ranunculus bulbosus</i> L.	HC	MD
Resedaceae	<i>Reseda alba</i> L.	TH	MD. IT
	<i>Reseda arabica</i> Boiss.	TH	MD. IT
Rhamnaceae	<i>Rhamnus alaternus</i> L.	CH	MD
	<i>Ziziphus lotus</i> L.	CH	MD. SA
Rosaceae	<i>Amygdalus communis</i> L.	PH	MD. IT
	<i>Sanguisorba minor</i> Scop.	HC	MD
Rubiaceae	<i>Callipeltis cucullaris</i> L.	HC	MD
	<i>Crucianella aegyptiaca</i> L.	TH	MD
	<i>Galium aparine</i> L.	TH	MD. ES. IT
	<i>Galium murale</i> L.	TH	MD
	<i>Galium setaceum</i> Lam.	TH	IT
	<i>Galium tricornutum</i> Dandy.	TH	MD. IT
	<i>Galium verrucosum</i> Huds.	TH	MD
	<i>Sherardia arvensis</i> L.	TH	MD. IT
	<i>Valantia hispida</i> L.	TH	MD
	<i>Valantia lanata</i> Delile.	TH	MD
	<i>Ruta chalepensis</i> L.	CH	MD
Rutaceae	<i>Ruta graveolens</i> L.	CH	ES
Santalaceae	<i>Thesium humile</i> Vahl.	TH	MD
Scrophulariaceae	<i>Kickxia aegyptiaca</i> L.	CH	MD. SA
	<i>Linaria simplex</i> (Willd) DC.	TH	MD. IT
	<i>Linaria tarhunensis</i> Pamp.	TH	MD. IT
	<i>Misopates orontium</i> L.	TH	MD
	<i>Scrophularia arguta</i> Aiten.	TH	MD
Solanaceae	<i>Lycium europaeum</i> L.	CH	MD
	<i>Nicotiana glauca</i> Graham.	PH	PL
	<i>Solanum nigrum</i> L.	TH	MD. ES. IT
Urticaceae	<i>Parietaria mauritanica</i> Durieu.	TH	MD. ES. IT
	<i>Urtica pilulifera</i> L.	TH	MD. ES. IT
	<i>Urtica urens</i> L.	TH	MD. ES
Valerianaceae	<i>Centranthus calcitrapa</i> L.	TH	MD
	<i>Valerianella chlorodonata</i> Cosson.	TH	MD
	<i>Valerianella discoidea</i> L.	TH	MD
	<i>Valerianella petrovichi</i> Asherson.	TH	MD
Zygophyllaceae	<i>Fagonia cretica</i> L.	CH	SA
	<i>Fagonia tenuifolia</i> Steud.	CH	SA
Monocotyledones			
Alliaceae	<i>Allium ampeloprasum</i> L.	GH	MD. IT
	<i>Allium leucanthum</i> C.	GH	MD. IT
	<i>Allium longanum</i> Pamp.	GH	MD. IT
	<i>Allium nigrum</i> L.	GH	MD
	<i>Allium roseum</i> L.	GH	MD
	<i>Allium negrianum</i> Maire.	GH	MD
Arecaceae	<i>Phoenix dactylifera</i> L.	PH	SA
Amoryllidaceae	<i>Pancratium foetidum</i> Pommel.	GH	MD
Iridaceae	<i>Iris sisyrinchium</i> L.	GH	MD. IT
	<i>Iris germanica</i> L.	GH	MD. IT

Liliaceae	<i>Gladiolus byzantinus</i> Miller.	GH	MD. IT
	<i>Androcymbium gramineum</i> Cav.	GH	MD. SA
	<i>Asparagus stipularis</i> Forsk.	GH	MD. SA
	<i>Asphodelus fistulosus</i> L.	GH	MD. SA
	<i>Asphodelus tenuifolius</i> L.	HC	MD. SU
	<i>Asphodelus microcarpus</i> Salzm.	GH	MD. SA
	<i>Bellevallia sessiliflora</i> Viv.	GH	MD
	<i>Dipcadi serotinum</i> L.	GH	MD
	<i>Gagea fibrosa</i> Desf.	GH	MD
	<i>Muscari comosum</i> L.	GH	ES
	<i>Ornithogalum arabicum</i> L.	GH	MD
	<i>Ornithogalum pyrenaicum</i> L.	GH	MD. ES
	<i>Scilla peruviana</i> L.	TH	MD. SA
	<i>Urginea autumnalis</i> L.	GH	MD
	<i>Urginea maritime</i> L.	GH	MD
Poaceae	<i>Aegilops kotschy</i> Boiss.	TH	IT. SA
	<i>Aegilops geniculata</i> Roth.	TH	MD
	<i>Aeluropus lagopoides</i> L.	CH	IT. SA
	<i>Avena barbata</i> Pott.	TH	MD
	<i>Avena longiglumis</i> Durieu.	TH	MD. SA
	<i>Avena sativa</i> L.	TH	ES
	<i>Avena sterilis</i> L.	TH	MD. IT
	<i>Briza maxima</i> L.	TH	MD
	<i>Bromus alopecuroides</i> Poir.	TH	MD
	<i>Bromus diandrus</i> Roth.	TH	MD
	<i>Bromus madritensis</i> L.	TH	MD
	<i>Bromus rigidus</i> Roth.	TH	MD
	<i>Bromus rubens</i> L.	TH	MD
	<i>Catapodium maritimum</i> L.	TH	MD
	<i>Cutandia dichotoma</i> Forsk.	TH	IT. SA
	<i>Cynodon dactylon</i> L.Pers.	HC	PL
	<i>Cynosurus cloratus</i> Lehm.	HC	PL
	<i>Cynosurus elegans</i> Desf.	TH	MD. IT
	<i>Dactylis glomerata</i> L.	HC	MD. ES. IT
	<i>Eleusine indica</i> L.	TH	ES
	<i>Gastridium ventricosum</i> Gouan.	TH	MD
	<i>Hordeum murinum</i> L.	TH	MD. ES
	<i>Hordeum spontaneum</i> C. Koch.	TH	MD. IT
	<i>Hordeum vulgare</i> L.	TH	ES
	<i>Hyparrhenia hirta</i> L.	CH	MD. IT. SA
	<i>Lagurus ovatus</i> L.	TH	MD
	<i>Lamarckia aurea</i> L.	TH	MD. IT
	<i>Lolium loliaceum</i> Bory.	TH	MD
	<i>Lolium multiflorum</i> Lam.	TH	MD
	<i>Lolium rigidum</i> Gaud.	TH	MD. IT
	<i>Lophochroa pumil</i> Desf.	TH	MD. ES
	<i>Lophochroa salzmannii</i> Boiss.	TH	MD. ES
	<i>Lygeum spartum</i> L.	TH	MD. ES
	<i>Pennisetum setaceum</i> Forssk.	HC	SA
	<i>Phalaris minor</i> Retz.	TH	MD. IT
	<i>Phragmites australis</i> Cav.	HC	PL
	<i>Piptatherum miliaceum</i> L.	HC	MD
	<i>Poa sinaica</i> Steud.	HC	IT
	<i>Polypogon monspeliensis</i> L.	TH	MD. IT. SA
	<i>Psilurus incurvus</i> Gouan.	TH	MD. IT
	<i>Stipa capensis</i> Thunb.	HC	IT. SA
	<i>Stipa parviflora</i> Desf.	HC	IT
	<i>Stipa tenacissima</i> L.	HC	ES. SA
	<i>Trachynia distachya</i> L.	TH	MD. IT

References

1. Abaad Magazine. Lebanese Center for Studies, Beirut 1998, 8.
2. Alavi SA. Asteraceae no.107. In: Jafri & El - Gadi (editor) Flora of Libya AL-Faateh. Univ. Fac. Sci. Dept. Bot. Tripoli. Libya 1983.
3. Ali SI, Jafri SMH. (Editors) Flora of Libya, Al-Faath. Univ. Fac. Sci, Dept. Bot. Tripoli 1976-77.
4. Al-Masallati, Naima Abdulsalam. Plant Diversity Through Protected Mountain Heights, and Maslata National Park, Master Thesis, Benghazi University, Libya 2013.
5. Al-Qamati, Amani Faraj. Medicinal Plants in Al-Marqab popularity, distribution, classification and importance - Master Thesis - Al-Marqab University - Al-Khums - Libya 2004.
6. Ani Tariq, Mufti Muhannad Mohammed. Environment and Sustainable Development Research 2002;1:5.

7. Corti R. Flora Vegetazione Del Fezzan E Della Regione Di Gat, Firenze, Tabella I 1942.
8. Daabas MY. Nature reserves and parks in the Kingdom of Saudi-Arabian Publishing House Bitash Center - Alexandria – Egypt 2002.
9. Duraand E, Barratte G. Florae Libycae Prodromus 1910.
10. El Werfalyi AD, Hassan SA. Vegetation management for Msellata Natural Reserve in Libya. Al- Qala Magazine. Number 2018;9:855-886.
11. EL-Gadi A *et al.* New plant records for Libya 1987.
12. Enayet ABM, EL- Gadi AA. Orichidaceae no.119. In: Jafri & EL- Gadi (editors) Flora of Libya AL-faateh. Univ,Fac. Sci. Dept. Bot. Tripoli. Libya 1985.
13. Environment Public Authority. Department of Natural Environment Management - Tripoli 2005.
14. Erteeb FB, Sherif AS. Cyperaceae no.120.In: Jafri &El - Gadi (editor) Flora of Libya AL-faateh. Univ. Fac. Sci. Dept. Bot. Tripoli,Libya 1985.
15. Hassan Salem Ahmed. Environmental and Taxonomic Study of Obelisks Protected Plants - Master Thesis - Al-Marqab University – Libya 2008.
16. Jafri SM, El-Gadi AA. (Editors Folra of Libya, Al faateh. Univ. Fac. Sci. Dept. Bot. Tripoli 1977-87.
17. Jafri SMH. Fabaceae no.86.In: Jafri & El - Gadi (editor) Flora of Libya AL-faateh. Univ. Fac. Sci. Dept. Bot. Tripoli. Libya 1980.
18. Keith HG. Libyan flora-London England 1965, 1.2.
19. Labani RM, EL-Gadi AA. Iridaceae no.81.In: Jafri & El - Gadi (editor) Flora of Libya AL-faateh.Univ,Fac. Sci. Dept. Bot. Tripoli. Libya 1980.
20. Pampanini R. Plantae Tripolitaniae - Firenze, Stabilmento pellas 1914.
21. Qaiser M, El- Gadi A. Acritical Analysis of The Flora Libya - Libyan, J Sci 1984.
22. Raunkiaer C. The Life Forms of Plants and Statistical Plant Geography. Introduction by A.G. Tansley. Oxford University Press, Oxford. Collection of 16 of Raunkiaer's publications plus one new 1934, 632.
23. Saad GC. Taxonomic Study of the components of the vegetation Valley Gdo Sahl Al-jafarah area. M. Sc. Thesis - Botany Department of the Faculty of Science - Al-Zawia University. Al-Zawia. Libya 2013.
24. Sharaf, Abdul Aziz Tareeh. Geography of Libya - Alexandria – Egypt 1996.
25. Siddiqi MA, EL-Gadi A, Sherif AS, EL-Taife. New plant records for Libya 1986.