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مقارنة التركيب الفلوري وتحليل أشكال حياة نباتات السفوح الشمالية والجنوبية للجبل الأخضر، ليبيا

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Comparative Floristic composition and Life- Form Analysis of the Northern and Southern Slopes of the AL-AKhdar Mountainous, Libya

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الملخص:
تم إجراء الدراسة في منطقة الجبل الأخضر الواقعة في شمال شرق ليبيا، خلال فصلي الربيع لعامي 2024 و2025. تم اختيار أحد عشر موقعًا، شملت 6 مواقع على السفح الشمالي و5 مواقع على السفح الجنوبي، مع اختلافات في تدرج الارتفاع. تم حصر 569 نوعًا نباتيًا، تنتمي إلى 325 جنسًا و80 عائلة. تم إجراء مقارنة بين التركيب النباتي وأشكال الحياة عبر سفوح الجبل، وأظهرت النتائج أن العائلات الاعلى عدد في الأنواع كانت على النحو التالي: عائلة المركبة 74 نوع تليها المركبة 49 نوع ثم النجيلية 48 نوع، عائلة الخيمية 44 نوع ثم عائلة الشفوية 27 نوع نباتي. بناءً على فترة حياتها النباتات، سجل 268 نوعًا معمرا (47.01%) والحوليات 301 نوعًا (52.99%) ومنها تواجد النباتات الارضية التي تنتمي اليها 79 نوعًا (13.88%) والتي تكون مدفونة تحت سطح التربة في الصيف. أظهرت نتائج تحليل أشكال الحياة للنباتات المدروسة وفق تصنيف رونكيير أن النباتات الحولية هي الأكثر سائدة بعدد 298 نوعًا (52.74%)، تليها النباتات نصف المخفية 108 نوعا (18.98%)، والنباتات القزمة 36 نوعًا (7.44%)، والنباتات الظاهرة 46 نوعًا (8.08%)، والنباتات الطفيلية المزهرة نوعان (0.33%). السفح الشمالي أكثر تنوعًا من السفح الجنوبي بسبب التضاريس والمناخ، وكما تلعب الظروف البيئية دورًا رئيسيًا في تفاوت التركيب الفلوري وتنوع أشكال الحياة. من الضروري المحافظة على هذا التنوع وضمان استدامة الغطاء النباتي من خلال استراتيجية واضحة.

الكلمات المفتاحية: التركيب الفلوري، تحليل أشكال الحياة، الجبل الأخضر، سفوح الجبل.

Abstract:
The study was conducted in the Green Mountain region, located in northeastern Libya, during the spring seasons of 2024 and 2025. Eleven sites were selected, including 6 on the northern slope and 5 on the southern slope, with variations in elevation gradients. A total of 569 plant species were recorded, belonging to 325 genera and 80 families. A comparison was made between the floristic composition and life forms across the mountain slopes, and the results showed that the families with the most species were as follows the Asteraceae 74 sp, followed by the Fabaceae 49 sp, then the Poaceae 48

sp, the Apiaceae 44 sp and Lamiaceae 27 sp. Based on the Life span in study 268 (47.01%) species were Perennial and 301 (52.99%) species of Annuals, which are close due to the presence of geophytes belonging 79 (13.88%) to the perennials that are buried beneath the soil surface in summer. The results of the analysis of life forms of the studied plants according to Raunkiaer's classification showed that Therophytes are the most dominant 298 species (52.74%), followed by hemicryptophytes 108 species (18.98%), Chamaerphytes 36 species (6.32%), phanerophytes 46 species (8.08%), and flowering parasitic plants 2 species (0.35%). The northern slope is more diverse than the southern slope due to the topographic and climate, and environmental conditions play a key role in the variation of floristic composition and the diversity of life forms. It is necessary to conserve and maintain this diversity and ensure the sustainability of the vegetation through clear strategy.

Keywords: Floristic composition, Life- forms Analysis, Al-Jabal Al-Akhdar, Mountains slopes

Introduction:

The floristic composition and plant life forms are among the most important environmental indicators that reflect species' responses to climatic variations and different habitats. Changes in rainfall amounts, variations in temperatures, and altitudinal gradients are all key factors that affect species distribution, diversity, and functional structure, as well as the dominance of certain plant groups over others. Moreover, the study of life forms is an important tool for understanding the morphological and functional adaptations of plants to surrounding conditions, especially in environments with climatic variability.

In Libya, about 95% of the land is desert and it is one of the driest countries in the world. [1], Rainfall in the northern part of the country varies between 100-500 mm/year; and the temperatures are very high with an annual average temperature of 27°C, while in the southern part it is 10 mm/ year, with some areas completely dry. The dominant climatic effects come from the Mediterranean Sea and the Sahara Desert. [2]. When comparing the country's area and vegetation, it is considered poor, as the number of plant species is estimated at around 2013 species, belonging to 880 genera and 155 plant families. The coastal strip represents 5.5% of the total area of Libya, yet it is considered more fertile, with seasonal rainfall [3], The vegetation and flora of AL-Jabal AL-Akhdar consists of a number of plant species which have different life forms with different strategies to avoid or escape from extreme climatic factors, especially the long drought period with high temperature in summer [4], [5]. Usually, Vegetation of the wadis are subjected to destruction due to torrents and grazing, as torrents uproot plants and partially destroying them, erode the soil layer, and grazing also contributes [6].

The techniques used to classify life form have been developed, and the most important and simplest of them is the Runkier system [7]. Raunkiaer [8] provided this classification system based on the position and degree of protection of the renewing buds which are responsible for the renewal of the aerial plant body after an unfavorable season. Accordingly, plant species can be classified into five main classes: phanerophytes, chamaephytes, hemicryptophytes, cryptophytes and therophytes. Life form is the sum total of adaptations of plant to climate [9]. Climate is considered a good indicator and is assumed to develop in response to environmental conditions. [10]. According to Cain [11] life form study is an important part of vegetation description, ranking next to floristic composition. the biological spectrum is helpful as an index of forest landscape health status. Biological spectrum may set rules for a community's optimisation and eco-restoration when performed at regular intervals [12]. The flora of Libya is significantly influenced by the Mediterranean climate, as well as the IT region and the Sahara Desert [2]. Therophytes are well-adapted to arid conditions and limited rainfall [13].

The Green Mountain region (the northeastern part of Libya) witnessed studies in the early 1900’s by Italian researchers on the diversity of plants, vegetation cover, and biodiversity there. Recently, several survey studies on vegetation have been conducted by local researchers, but published research is still limited and has not focused on the impact of human activities on the floristic composition of the area [14]. According to recent studies, the vegetation and flora of the Green Mountain, and the effect of elevation gradient on the distribution of life patterns of plant species, such as [15], [16], [17], [18], [19], and [20].

The Green Mountain is considered one of the most important vital areas, distinguished by unique plant diversity and sharp environmental gradients, as it combines clear differences in elevation, exposure, and rainfall, making it an ideal model for studying the impact of environmental factors on the formation of plant communities. The northern and southern slopes of the Green Mountain represent two contrasting environments in terms of climatic and micro-environmental conditions. The northern slope is more exposed to humidity and marine effects, whereas the southern slope features a drier climate and higher temperatures, leading to noticeable differences in water availability and plant diversity. Despite the ecological importance of this area and its role in preserving Libyan biodiversity, comprehensive comparative studies that encompass floral composition, life forms, and environmental gradients (elevation, rainfall, exposure) remain limited. Hence, the importance of this study emerges,

aiming to analyze the plant differences between the northern and southern slopes and determine the extent of environmental factors' influence on community formation, which contributes to supporting biodiversity conservation plans and guiding future studies related to ecosystem management.

Materials and Methods:

Study area: This work was carried out in Al-Jabal Al-Akhdar, located on the North-Eastern of Libya. Eleven sites were selected in the Green Mountain, with six representing the northern slope as follows: Wadi Al-Akar, Gasr Libya, Al-Wardia, Massa, Wadi Al-Kouf, and Shahat and five representing the southern slope ,The following: Sidi Al-Hamery, slonta, Qandula, Marrow, and Taknis, these sites in Al-Jabal Al-Akhdar representing various topographic with a gradient in elevation from sea level using a GPS, with a code for each site as follows: R1 to R11 shown in (Table:1 and fig :1).

Data Collection; In this botanical survey Eight field trips were conducted seasonally to the study area from 2024 to 2025, collections included all wild flora plant species. Specimens were identified based on the Flora of Libya by [21], [22], [23], [24] and [25]and the Flora of Egypt [26] Furthermore, All the plants species were classified on the basis of life forms as defined by [8]**.**

Soil: The soil in the study area varies according to its geographic location, with clay being predominant in the southern sites, while reddish clay soil increases as we head north. The soil is mixed with limestone rocks, which represent the soil of the Green Mountain, and the soil depths vary from place to place, ranging from 15 to 40 cm.

Climate: The variability of rainfall in the study areas changes from month to month and from year to year, with a decrease in rainfall from the northern Slope of the mountain. The Mediterranean climate prevails, which can be very cold during the winter months (December - January - February) because it is the highest area in the Green Mountain, where the Sidi El-Hemery area represents the highest point at about 839 meters above sea level and the temperature can reach freezing point. The months of April, May, June, July, August, and September represent the dry season that extends for a period of six months, during which temperatures reach their highest levels, and rainfall is almost nonexistent [27].

Table (1) Location and elevation of study sites.

Sites	Symbol	Longtitude	Latitude	Elevation a.s.l (m)	Slopes
Wadi EL-Akar	R1	32° 30' 4.1" N	20° 43' 40.4" E	302	North
Gasr Libya	R2	32° 38' 46.4" N	21° 28' 48.0" E	376	North
El-Wardia	R3	32° 39' 16.6" N	21° 33' 54.7" E	445	North
Massa	R4	32° 43' 32.5" N	21° 35' 26.7" E	506	North
Wadi EL-Kouf	R5	32° 41' 15.0" N	21° 33' 48.6" E	310	North
Shahat	R6	32° 50' 29.1" N	21° 53' 50.4" E	355	North
Sidi el-Hemery	R7	32° 38' 21.0" N	21° 47' 21.7" E	839	South
Slonta	R8	32° 30' 55.8" N	21° 27' 20.1" E	529	South
Qandula	R9	32° 31' 23.5" N	21° 35' 42.5" E	626	South
Marrow	R10	32° 28' 58.0" N	21° 22' 28.7" E	473	South
Taknis	R11	32º 26 `59.5"N	21º 06` 19.5"E	448	South

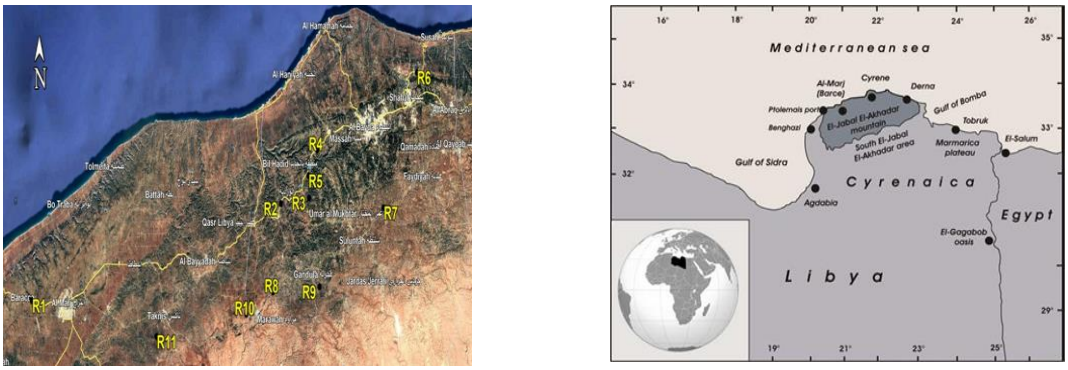

Fig (1): Map of the study sites.

Results and Discussion:

In the present investigation, 569 species were reported belongings to 325genera and 80 families in Green Mountain. species are recorded (Appendeix) of which Dicots includes 454 Species and Monocots 112 Species. Dicots are represented by 67 Families and 263 Genera while the Monocots are represented by 11 Families and 60 Genera. The contribution of Species included 79.78 % and 19.68 % respectively for dicots and monocots. Taxa of study area to compered between The northern slope 437

species and 425 species in the southern slope, In the Northern slope species are recorded (Figure 2) of which Dicots includes 359 Species and Monocots 84 Species. Dicots are represented by 69 Families and 215 Genera while the Monocots are represented by 9 Families and 49 Genera (Table 2). also in the Southern slope species are recorded (Figure 3) of which Dicots includes 333 Species and Monocots 79 Species. Dicots are represented by 68 Families and 202 Genera while the Monocots are represented by 11 Families and 48 Genera. The contribution of Species included 80.62 % and 19.12 % respectively for dicots and monocots in the Northern slope and included 80.49 % and 10.98 % respectively for dicots and monocots in the Southern slope (Table 3). as reported by other researchers from other areas i.e., [21], [22], [28], [29], [30], [31], [32], [33], [34], [35], [36], [37]and [38].

Table (2): of plant groups in all the study sites.

Taxa		Families	Genera	Species
Gymnosperms		2	2	3
Angiosperms	Monocot	11	60	112
	Dicot	67	263	454
Total		80	325	569

Table (3): of plant groups in The Northern and Southern slopes of the study sites.

Taxa		Northern slope			Southern slope		
		Families	Genera	Species	Families	Genera	Species
Gymnosperms		2	2	3	1	1	1
Angiosperms	Monocot	9	49	84	11	48	79
	Dicot	69	215	359	68	202	333
Total		80	266	446	80	251	413

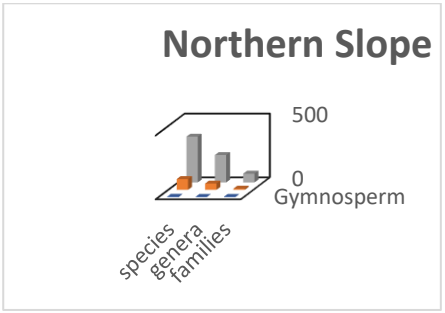

Figure (2): shows Classification of plant groups on the Northern slope

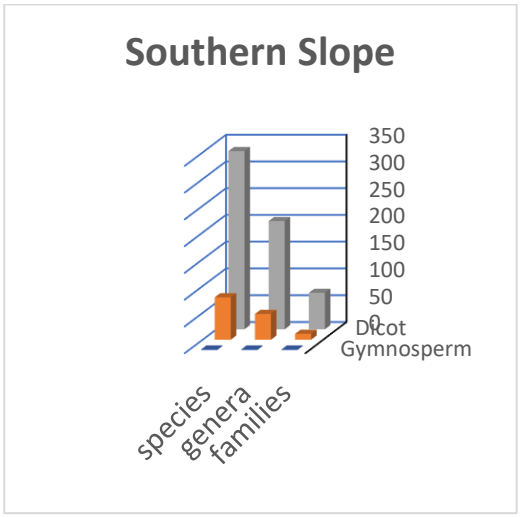

Figure (3): shows Classification of plant groups on the Southern slope.

The results obtained showed that the largest plant families in all study areas were as follows Asteraceae (74 sp.) followed by Fabaceae (49 sp.), Poaceae (48 sp.), Apiaceae (44 sp.) Lamiaceae (27 sp.). for each Rubiaceae, Geraniaceae and Rununculaceae (15 sp.) and Liliaceae (14 sp.), while other families each was represented by 13 to 1 sp (Figure 4). And also when comparing the two slopes of the mountain The largest represented families of The Northern slope were Asteraceae (52 sp.) followed by Poaceae (41 sp.), Fabaceae (34 sp.), Lamiaceae (26 sp.), Apiaceae (21 sp.), Liliaceae (13

sp.), for each Rubiaceae and Euphorbiaceae (12sp.), Runnunculaceae (11 sp.), Geraniaceae (10 sp.), while other families each was represented by 9 to 1 sp. In The southern slope were Asteraceae (59 sp.) followed by Fabaceae (45 sp.), Poaceae (43 sp.), Apiaceae (24 sp.), Lamiaceae (18 sp.), Geraniaceae (15 sp.), for each Rubiaceae and Brassicaceae (13 sp.), Ranunculaceae (12 sp.) and Liliaceae (10 sp.), while other families each was represented by 9 to 1 (Figure 5) here was a similarity in the results with [21], [33, [34], [35], [36], [37]. [38] and [39].

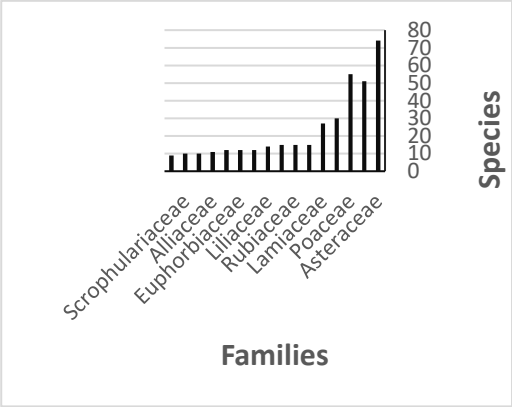

Fig (4): The largest represented families of all the study area.

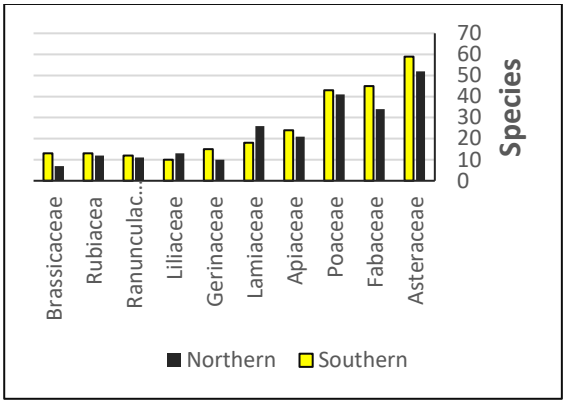

Fig (5): The largest represented families of Northern and Southern slopes in the study area.

Table (4): The number of species of Libyan flora compared to the number of species from the northern and southern slopes with the percentage of Libyan flora.

N	Families	Number of species				
		In flora of Libya	Northern slope	%	Southern slope	%
1	Asteraceae	240	52	21.66	59	24.58
2	Poaceae	228	41	17.98	43	18.85
3	Fabaceae	200	34	17	45	22.5
4	Brassicaceae	100	7	7	13	13
5	Apiaceae	75	21	28	24	32
6	Lamiaceae	62	26	41.93	18	29.03

The results obtained indicated that herbs constitute the majority of plants in the Green Mountain in general, both on the northern and southern slopes, and annual (Ephermals) herbs are more prevalent compared to perennial herbs with the proportions as follows: herbs (91%), Shrubs (7%) and trees (2%), (Figure 6). Based on the Life span in study 268 (47.01%) species were Perennial and 301 (52.99%) species of Annials (Figure 7). To comparable Life span in the northern slope 198 (44.39%) species were Annual then herbs, shrubs and trees 248 (55.61%) species of perennial (Figure 6). the southern slope 275 (66.58%) species were annual then herbs, shrubs and trees 138 (33.42%) species of perennial (Figure 8) Our findings are comparable with those of [40] and [41] also It was observed that the herbs are more diverse in the Mediterranean mountains ecological system.

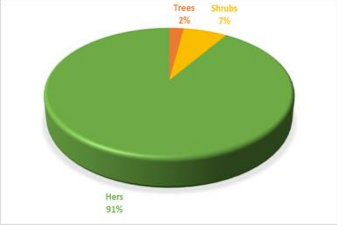

Fig (6): Habit plant of all species of the study sites.

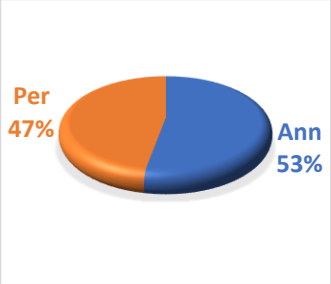

Fig (7): Life span of all species of the study sites.

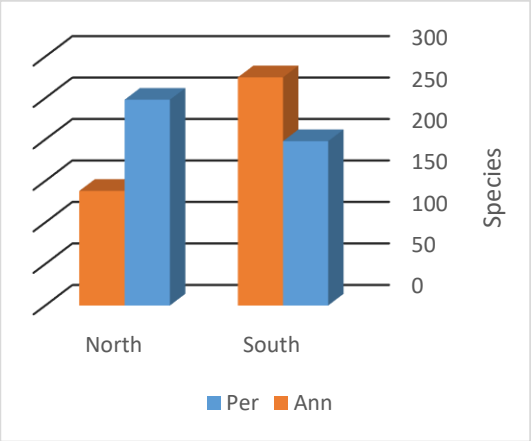

Fig (8): Life span of species of Northern and Southern slopes of study sites.

The life form spectrum of Green mountain showed that the most dominant life form is Therophytes with (52.74 %), followed by Hemicryptophytes (18.98%) and Geophytes (13.88 %), phanerophytes (8.08 %), Chamaephytes (6.32%) then Parasites (0.35 %) (Table 4 and Fig. 8 This generally represents the types of life forms in the study areas before making a comparison between the two mountain slopes.

The results of the comparison between the two slopes of the mountain in terms of life forms showed that the most dominant life form is Therophytes with (44.85 %), followed by and Geophytes (21.73 %) Hemicryptophytes (15.56%), phanerophytes (10.06 %), Chamaephytes (7.32%) then Parasites (0.45 %) in the North slope while in the Southern slope showed that life form is Therophytes with (67.29 %), followed by and Geophytes (33.88 %) Hemicryptophytes (10.58%), phanerophytes (3.76 %) and Chamaephytes (4.47%),(Table 5 and Fig. 9). The difference in the proportions of Therophytes shows that the southern slope has a higher proportion and fewer trees due to the low rainfall and higher elevation compared to the northern slope. This results in the growth of herbs, especially seasonal ones, after the rainfall, which cannot withstand the dry period in summer. Additionally, a number of studies have shown that the diversity of life forms is correlated with variations in climate and decreases with elevation. [42] and [43].

The results showed that Throphytes are more dominant in all the study sites, which is attributed to their short life cycle during the rainy season, and weather factors directly affect the patterns of flowering plant life, as confirmed by [35]. The dominance of Therophytes in arid areas may be attributed to the long duration of drought throughout the year, from April to October, [43], [44]. here was a similarity in the results agreed with studies [46], [47], [48], [49], [50], [51] and [52]. The dominancy of Therophytic life form shows that the study area is under heavy anthropogenic pressure due to unsustainable use, over grazing and deforestation [53].

Table (5): life-forms classes of species of the flora of all study sites

Life form classes	Abbreviation	No. of species	%
Phanerophytes	Ph	46	8,08
Chamaephytes	Ch	36	6,32
Hemicryptophytes	He	108	18,98
Geophytes	Ge	79	13,88
Therophytes	Th	298	52,74
Parasites	P	02	0,35

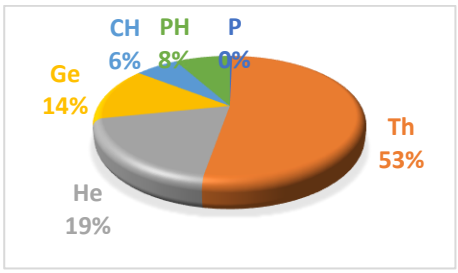

Fig (9): Life form spectrum of plants in all study sites.

Table (6): life-forms classes of species of the flora of North and South slopes study sites.

Life form classes	Abbreviation	Northern slope		Southern slope	
		No. of species	%	No. of species	%
Phanerophytes	Ph	44	10,06	16	3,76
Chamaephytes	Ch	32	7,32	19	4,47
Hemicryptophytes	He	68	15,56	45	10,58
Geophytes	Ge	95	21,73	59	13,88
Therophytes	Th	196	44,85	286	67.29
Parasites	P	2	0,45	-	-

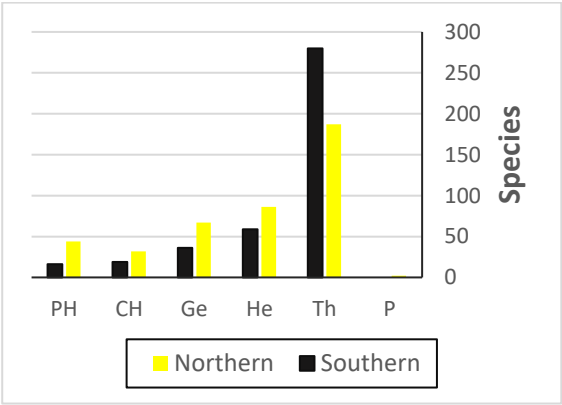

Fig (10): Life form spectrum of plants in the Northern and Southern slopes of study sites.

Conclusion:

This study showed that there are 569 species including 325 genera and 80 families in this area The predominant life form of the plants is Thorphytes. This study is the fundamental base to light out the important sources of valuable plant species that found in the in Al-Jabal AlAkhdar. The results show a comparison of vegetation and plant life forms, revealing differences between the northern and southern slopes through the floral composition, which clearly demonstrates the effect of altitude on the distribution and diversity of plants and their patterns through the topographic and climate, which play a major role in the variation of the floral composition of plants, as well as human activities such as grazing, deforestation, and urban expansion, Exposure to periods of drought contributes to changes in the floral composition, especially Ephermals plants. Therefore, it is necessary to preserve this diversity, which supports the sustainable development of the Green Mountain region.

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Appendix:

list of plants life form, Growth habit and life span of study sites Per. = Perennials, Ann. = Annuals; Th. = Therophytes, H.=Hemicryptophytes, G.= Geophytes, Ch. = Chamaephytes, P.=Parasites.

Scientific names	Family	Slope		Life Span	Growth Habit	Life form
		North	South			
Anvillea garcinii (Burm.f.) DC.	Asteraceae	√		Per	her	He
Xeranthemum inapertum (L.) Miller.	Asteraceae	√	√	Ann	her	Th
Varthemia candicaus (Delile.) Boiss.	Asteraceae	√	√	Per	her	He
Urospermum picroides (L.) F.W.Schmidt	Asteraceae		√	Ann	her	Th
Urospermum dalechampii (L.) F.W.Schmidt	Asteraceae	√		Per	her	He
Tyrimnus leucographus (L.) Cass.	Asteraceae		√	Ann	her	Th
Tragopogon hybridus L.	Asteraceae		√	Ann	her	Th
Tolpis virgata (Desf.) Bertol.	Asteraceae	√	√	Per	her	He
Sylibum marianum (L.) Gaetner	Asteraceae		√	Ann	her	Th
Sonchus oleraceus L.	Asteraceae	√	√	Ann	her	Th
Sonchus asper (L.) Hill	Asteraceae	√	√	Per	her	He
Scorzonera lacinita L.	Asteraceae	√		Per	her	Ge
Scorzonera hispanica L.	Asteraceae	√	√	Per	her	Ge
Reichardia picroides (L.) Roth.	Asteraceae		√	per	her	He
Reichardia tingitana (L.) Roth	Asteraceae	√	√	per	her	He
Pulicaria vulgaris Gaertin.	Asteraceae	√		Ann	her	Th
Pulicaria inuloides(Poiret.) DC.	Asteraceae		√	Ann	her	Th
Ptilostemon gnaphaloides (Cirillo) Sojak	Asteraceae	√	√	Ann	her	Th
Picris mauginiana Pamp.	Asteraceae	√		Ann	her	Th
Picris asplenioides L.	Asteraceae	√	√	Ann	her	Th
Phagnalon saxatile (L.) Cass.	Asteraceae	√	√	Per	her	He
Phagnalon rupester (L.) DC.	Asteraceae	√		Per	her	He
Pallenis spinosa (L.) Cass.	Asteraceae	√		Per	her	He
Pallenis cyrenaica Alavi Asteraceae	Asteraceae	√		Per	her	He
Onopordum arenarium(Dest.) Pomel.	Asteraceae	√		Per	her	He
Onopordum cyrenaicum Maire & Weiller	Asteraceae	√	√	Per	her	He
Notobasis syriaca (L.) Cass.	Asteraceae	√	√	Ann	her	Th
Chamomilla aurea (Loefl.) Sch.Bip.	Asteraceae	√		Ann	her	Th
Leontodon tuberosus L.	Asteraceae	√	√	Per	her	He
Launaea nudicaulis (L) Hooker.	Asteraceae	√		Per	her	He
Iogfia gallica L.	Asteraceae		√	Ann	her	Th
Hypochaeris glabra L.	Asteraceae		√	Ann	her	Th
Hypochaeris achyrophorus L.	Asteraceae		√	Ann	her	Th
Helichrysum stoechas (L.) Moench A	Asteraceae	√	√	Per	her	He
Filago pyramidata L.	Asteraceae	√	√	Ann	her	Th
Evax pygmaea L. Brot	Asteraceae		√	Ann	her	Th
Echinops galalenis Schwein.	Asteraceae	√	√	Per	her	He
Echinops cyrenaicus Durand & Barratt.	Asteraceae		√	Ann	her	Th
Dittrichia viscosa (L.) Greuter	Asteraceae	√		Per	her	He
Cynara cyrenaica Maire & Weiller	Asteraceae	√	√	Ann	her	Th
Crepis senecioides Delile subsp. filiformis (Viv.) Alavi	Asteraceae	√	√	Ann	her	Th
Crepis pusilla (Sommier) Merxm.	Asteraceae	√	√	Ann	her	Th
Cichorium spinosum L.	Asteraceae	√	√	Per	her	He
Cichorium pumilum Jacq.	Asteraceae	√	√	Ann	her	Th
Cichorium endivia L. subsp. Divaricatum (Schousb.) P.D.	Asteraceae	√		per	her	Th
Cicerbita haimanniana (Ascher.) Beau	Asteraceae	√	√	Per	her	Ge

Chrysanthemum segetum L.	Asteraceae		√	Ann	her	Th
Chamomilla aurae (Loeft.) Gay ex Cosson &Kralik	Asteraceae		√	Ann	her	Th
Centaurea cyrenaica Beguinot & Vacc	Asteraceae		√	Ann	her	Th
Centaurea pumilio	Asteraceae	√	√	Ann	her	Th
Centaurea melitensis	Asteraceae	√	√	Ann	her	Th
Crupina vulgaris Cass	Asteraceae		√	Ann	her	Th
Carthamus divaricatus Beguinot&Vacc	Asteraceae	√	√	Ann	her	Th
Carthamus glaucus Bieb.	Asteraceae		√	Ann	her	Th
Amberboa tubiflora Murb.	Asteraceae	√	√	Ann	her	Th
Carthamus lanatus L.	Asteraceae	√		Per	her	Ch
Carlina lanata L.	Asteraceae	√	√	Ann	her	Th
Carlina involcrate Poiret.	Asteraceae		√	Ann	her	Th
Carlina sicula Ten	Asteraceae	√	√	Ann	her	Th
Calendula arvensis L.	Asteraceae	√	√	Ann	her	Th
Bellis sylvestris Cyn. var. cyrenaica Beg	Asteraceae		√	Ann	her	Th
Bellis sylvestris Cirillo	Asteraceae	√	√	Ann	her	Th
Asteriscus aquaticus (L.) Less	Asteraceae		√	Ann	her	Th
Anthemis cyrenaica Coss. var. cyrenaica	Asteraceae	√	√	Ann	her	Th
Anthemis cotula L.	Asteraceae		√	Ann	her	Th
Anthemis maritima L.	Asteraceae		√	Ann	her	He
Achilliea santolina L. Zefra	Asteraceae	√	√	Per	her	He
Evax contracta Boiss.	Asteraceae	√	√	Ann	her	Th
Cynara cornigera Lindley.	Asteraceae	√	√	Ann	her	Th
Centaurea alexandrina Delile.	Asteraceae	√	√	Ann	her	Th
Cardus pycnocephalus L.	Asteraceae	√	√	Ann	her	Th
Atractylis canduus (Fork.)Christensen.	Asteraceae	√		Per	her	He
Atractylis cancellata L.	Asteraceae		√	Ann	her	Th
Anacyclus clavatus (Desf.) Pers -	Asteraceae	√	√	Ann	her	Th
Trifolium scabrum L.	Fabaceae		√	Ann	her	Th
Trifolium subterraneum L.	Fabaceae	√	√	Ann	her	Th
Vicia lutea L.	Fabaceae	√	√	Ann	her	Th
Anthyllis tetraphylla	Fabaceae	√	√	Ann	her	Th
Astragalus taubertianus Aschres&Barbey.	Fabaceae		√	Ann	her	Th
Astragalus tribuloides Del.	Fabaceae	√	√	Ann	her	Th
Astraglus hispidulus DC	Fabaceae	√	√	Ann	her	Th
Calicotome spinosa (L.) Link	Fabaceae	√		Per	her	Ph
Calicotome villosa (Poir.) Link	Fabaceae	√		Per	her	ph
Genista acanthoclada DC.	Fabaceae	√	√	Per	her	Ph
Lathyrus gorgonei Parl	Fabaceae	√	√	Ann	her	Th
Lotus conimbricensis Brot.	Fabaceae	√	√	Ann	her	Th
Lotus gebella Vent.	Fabaceae		√	Ann	her	Th
Lotus halophilus Boiss . exBorum	Fabaceae	√	√	Ann	her	Th
Lotus creticus L.	Fabaceae	√		Per	her	He
Lotus cytisoides L.	Fabaceae		√	Ann	her	Th
Medicago lupulina L.	Fabaceae	√	√	Per	her	He
Medicago disciformis Dc	Fabaceae	√	√	Ann	her	Th
Medicago polymorpha L.	Fabaceae		√	Ann	her	Th
Medicago truncatula Gaertn.	Fabaceae	√	√	Ann	her	Th
Medicago cyrenaica Maire & Weill	Fabaceae		√	Ann	her	Th
Medicago minima L.	Fabaceae	√	√	Ann	her	Th
Melilotus indicus (L.) All.	Fabaceae	√	√	Ann	her	Th
Melilotus italicus (L.) Lam.	Fabaceae	√	√	Ann	her	Th
Onobrychis crista-galli (L.) Lam.	Fabaceae		√	Ann	her	Th
Ononis spinosa L.	Fabaceae	√	√	Per	her	He
Ononis pendula Desf.	Fabaceae		√	Ann	her	Th
Ononis hispida Desf.	Fabaceae	√	√	Per	Shr	Ch
Ononis natrix L.	Fabaceae	√		Per	Shr	Ch

Ononis viscosa L.	Fabaceae	√		Ann	her	Th
Spartium junceum L.	Fabaceae	√		Per	Shr	Ch
Tetragonolobus purpureum Lois.	Fabaceae	√	√	Ann	her	Th
Trifolium suffocatum L.	Fabaceae		√	Ann	her	Th
Trifolium campestre Schreb,	Fabaceae	√	√	Ann	her	Th
Trifolium uniflorum L.	Fabaceae		√	Per	her	He
Trifolium micranthum Viv	Fabaceae		√	Ann	her	Th
Trifolium strictum L	Fabaceae	√	√	Ann	her	Th
Trifolium tomentosum L.	Fabaceae	√	√	Ann	her	Th
Trifolium angustifolium L.	Fabaceae		√	Ann	her	Th
Trifolium arvense L.	Fabaceae	√	√	Ann	her	Th
Trifolium subterranean L.	Fabaceae		√	Ann	her	Th
Trignella maritima Del.ex Poir.	Fabaceae	√	√	Ann	her	Th
Trignella gladiata Stev.	Fabaceae	√	√	Ann	her	Th
Vicia laxiflora Brot.	Fabaceae	√	√	Ann	her	Th
Vicia peregrina L	Fabaceae	√	√	Ann	her	Th
Vicia hybrida L.	Fabaceae	√	√	Ann	her	Th
Vicia sativa L .	Fabaceae		√	Ann	her	Th
Vicia tetrasperma (L.) Schreb.	Fabaceae	√	√	Ann	her	Th
Vicia monantha Retz.	Fabaceae		√	Ann	her	Th
Aegilops neglecta Req.ex Berto.	Poaceae	√	√	Ann	her	Th
Triticum compactum Host.	Poaceae	√		Ann	her	Th
Avena barbata Pott ex Link.	Poaceae	√	√	Ann	her	TH
Avena sterilis L.	Poaceae	√	√	Ann	her	Th
Milium vernale M.Bieb.	Poaceae	√	√	Ann	her	Th
Polypogon monspecliensis (L.)Desf.	Poaceae		√	Ann	her	Th
Polypogon maritmus Willd.	Poaceae	√	√	Ann	her	Th
Polypogon semiverticllatus (Forsk.)Hyl.	Poaceae	√	√	Ann	her	Th
Gastridium ventricosum (Gouan) Schinz et Thell.	Poaceae	√	√	Ann	her	Th
Phalaris truncata Guss.	Poaceae	√	√	Per	her	He
Phalaris paradoxa L.	Poaceae	√	√	Ann	her	Th
Stipa capensis Thunb.	Poaceae		√	Ann	her	Th
Piptatherum miliaceum (L.)Coss.	Poaceae	√	√	per	her	He
Piptatherum coerulescens (Desf.) P.Beauv.	Poaceae	√		Per	her	He
Sporobolus virginicus (L.) Kunth.	Poaceae	√	√	per	her	He
Digitaria sanguialis (L.) Scop.	Poaceae	√	√	Ann	her	Th
Hyparrhenia hirta (L.)Stapf.	Poaceae	√	√	Per	her	Ge
Andropogon distachyos L.	Poaceae	√		Per	her	Ch
Sorghum halepensa (L.)Pers.	Poaceae	√	√	Per	her	Ge
Festuca arundinacea Schreb.	Poaceae	√	√	Per	her	Ge
Lolium perenne L.	Poaceae	√	√	Per	her	Ge
Lolium multiflorum Lam.	Poaceae	√		Per	her	Ge
Lolium rigidum Gaud.	Poaceae	√		Ann	her	Th
Lolium loliaceum (Bory et Chaub.) Hand-Mazz	Poaceae	√	√	Ann	her	Th
Ammophila austalis (Mbille.) Port et Rigo	Poaceae	√	√	Per	her	Ge
Bromus madritensis L.	Poaceae	√	√	Ann	her	Th
Bromus rubensL.	Poaceae	√	√	Ann	her	Th
Bromus intermodius Guss.	Poaceae		√	Ann	her	Th
Bromus lanceolatus Roth.	Poaceae	√	√	Ann	her	Th
Catapodium rigidum (L.) C.E. Hubb.	Poaceae	√	√	Ann	her	Th
Catapodium marinum (L.) C.E.Hubbard.	Poaceae		√	Ann	her	Th
Cynodon dactylon (L.) Pers.	Poaceae	√	√	Per	her	Ge
Crithopsis delileana (Pourr.) Breistr.	Poaceae		√	Ann	her	Th
Desmazeria philistaea (Bioss.)H.Scholz.	Poaceae		√	Ann	her	Th
Parapholis incurva (L.)C.E.Hubbard.	Poaceae		√	Ann	her	Th

Gaudinia fragilis (L.) P.Beauv.	Poaceae	√	√	Ann	her	Th
Lophochloa pubsscens (Lam.)H.Scholz.	Poaceae		√	Ann	her	Th
Hordeum bulbosum L.	Poaceae	√	√	Per	her	Ge
Hordeum murinum L. subsp. Murnium.	Poaceae	√	√	Ann	her	Th
Hordeum vulgare L.	Poaceae	√		Ann	her	Th
Melica minuta	Poaceae	√	√	Ann	her	Th
Phalaris minor Retza.	Poaceae	√		Per	her	Th
Psilurus incurvus (Gouan) Schinz et Thell.	Poaceae		√	Ann	her	Th
Dactylis glomerata L.	Poaceae	√	√	Ann	her	Th
Poa pentapolit ana H.Scholz.	Poaceae	√		Per	her	Ge
Poa infirma Kunth.	Poaceae	√	√	Ann	her	Th
Poa bulbosa L.	Poaceae	√	√	Ann	her	Th
Poa annua L.	Poaceae	√	√	Ann	her	Th
Trisetaria macrochaeta (Boiss.)Mair.	Poaceae		√	Ann	her	Th
Alyssum minus (L) Rothm	Brassicaceae		√	Ann	her	Th
Alyssum montanum L	Brassicaceae	√	√	Per	her	He
Biscutella didyma L.	Brassicaceae	√	√	Ann	her	Th
Brassica cyrenaica Spreng	Brassicaceae		√	Ann	her	Th
Capsella bursa-pastoris (L.) Medik.	Brassicaceae	√	√	Ann	her	Th
Cardamine hirsuta L.	Brassicaceae		√	Ann	her	Th
Cakile aegyptica (L.) Willd .	Brassicaceae	√		Ann	her	Th
Coronopus squamatus (Forsk.)Ascherson.	Brassicaceae	√	√	Ann	her	Th
Didesmus aegyptius (L.) Desv	Brassicaceae		√	Ann	her	Th
Diplotaxis virgata (Cav) DC	Brassicaceae		√	Ann	her	Th
Enarthrocarpus pterocarpus (Pers.) DC.	Brassicaceae		√	Ann	her	Th
Erophila verna (L.) Besser	Brassicaceae	√	√	Ann	her	Th
Matthiola lunata DC.	Brassicaceae	√	√	Ann	her	Th
Matthiola sinnata (L.) R.Br	Brassicaceae		√	Ann	her	Th
Pituranthos tortuosus (Desf)Benth.	Apiaceae	√		Per	her	Ch
Ammi majus L.	Apiaceae	√	√	Ann	her	Th
Ammi visnaga (L.) Lam	Apiaceae	√	√	Ann	her	Th
Bifora testiculata (L.) Roth.	Apiaceae	√	√	Ann	her	Th
Bunium incrassatum (Boiss.)Batt.	Apiaceae	√		Per	her	He
Crithmum maritimum L.	Apiaceae	√		Per	her	He
Athamanta della - cellae Ascher.et Barbey.	Apiaceae	√		Per	her	He
Bupleurum gerardii	Apiaceae	√	√	Ann	her	Th
Bupleurum trichopodum	Apiaceae		√	Ann	her	Th
Bupleurum semicompositum	Apiaceae		√	Ann	her	Th
Apium nodiflorum (L.) Lag.	Apiaceae	√	√	Ann	her	Th
Ammoides pusilla (Brot.) Breist.	Apiaceae	√	√	Ann	her	Th
Brachyapium dichotomum(L.) Maire.	Apiaceae	√	√	Ann	her	Th
Ferula marmarica Aschers. Et Traub.	Apiaceae	√	√	Ann	her	Th
Malabaila suaveolans (Del.)Coss.	Apiaceae	√	√	Per	her	He
Tordylium apulum L.	Apiaceae	√	√	Ann	her	Th
Torillis tenella (Del.) Reichb.	Apiaceae		√	Ann	her	Th
Turgenia latifolia (L.) Hoffm.	Apiaceae		√	Ann	her	Th
Daucus guttatus Sibth& Sm.	Apiaceae	√	√	Ann	her	Th
Daucus littoralis Sibth.& Sm.	Apiaceae		√	Ann	her	Th
Deverra tortuosa (Desf.) DC.	Apiaceae		√	Ann	her	Th
Eryngium campestre L.	Apiaceae	√	√	Per	her	He
Lagoecia cuminoides L.	Apiaceae	√	√	Ann	her	Th
Malabaila suaveolens Delile & Coss.	Apiaceae	√		Per	her	He
Scandix australis L.	Apiaceae		√	Ann	her	Th
Scandix pecten-veneris L.	Apiaceae	√	√	Ann	her	Th
Scandix stellata Banks&Sol	Apiaceae	√		Ann	her	Th
Thapsia garganica L.	Apiaceae		√	Per	her	Ch
Torilis arvensis (Huds.) Link	Apiaceae	√	√	Ann	her	Th

Torilis leptophylla (L.) Rchb.f.	Apiaceae		√	Ann	her	Th
Micromereria Juliana (L.) Bent ex Rechenb.	Lamiaceae	√	√	per	her	Ch
Ballota pseudo-dictamnus (L.) Benth	Lamiaceae	√		per	her	Ch
Calamintha incana (Sm.) Boiss. Ex Benth	Lamiaceae	√		per	her	Ch
Lamium amplexicaula L.	Lamiaceae	√	√	Ann	her	Th
Marrubium alysson L.	Lamiaceae	√	√	Per	her	He
Marrubium vulgare L.	Lamiaceae	√		per	her	He
Mentha pulegium L.	Lamiaceae	√		per	her	He
Micromeria graeca (L.) Benth. ex Reichenb.	Lamiaceae	√	√	Per	her	He
Micromeria guichardii(Quezel exZaffran) Brullo et Furnari.	Lamiaceae	√		Per	her	Ch
Nepeta cyrenaica Quezel & Zaffran.	Lamiaceae	√		Per	her	He
Phlomis floccosa D. Don	Lamiaceae	√	√	per	Shr	Ch
Prasium majus L.	Lamiaceae	√	√	per	Shr	Ch
Rosmarinus officinalis L.	Lamiaceae	√		per	Shr	Ch
Salvia fruticosa Mill.	Lamiaceae	√	√	per	her	Ch
Salvia spinosa L.	Lamiaceae	√		Per	her	He
Salvia verbenace L.	Lamiaceae	√	√	Ann	her	Th
Salvia viridis L.	Lamiaceae	√	√	Ann	her	Th
Satureja fortii Pamp.	Lamiaceae	√		Per	her	Th
Satureja thmbra L.	Lamiaceae	√	√	per	her	Ch
Scutellaria rubicunda Hornem.	Lamiaceae	√	√	Per	her	He
Stachys ocymastrum (L.)Briquet.	Lamiaceae		√	Ann	her	Th
Stachys rosea (Desf.) Bioss.	Lamiaceae	√	√	per	her	He
Stachys tournefortii Poiret.	Lamiaceae	√	√	Per	her	Ch
Teucrium barbeyanum Asch.	Lamiaceae	√	√	per	her	Ch
Teucrium davaeanum coss.	Lamiaceae		√	Per	her	Ch
Teucrium polium L.	Lamiaceae	√	√	Per	her	Ch
Thymus capitatus (L) Hoffm &Link.	Lamiaceae	√		Per	her	Ch
Urginea maritima (L.) Baker.	Liliaceae	√	√	per	her	Ge
Asparagus aphyllus L.	Liliaceae	√	√	Per	her	Ge
Colchicum ritchii R.Br.	Liliaceae		√	Per	her	Ge
Asphodelus microcarpus Salzm&Viv	Liliaceae	√	√	per	her	Ge
Asphodelus aestivus Brot.	Liliaceae	√	√	per	her	Ge
Asphodelus Tenuifolius Cav.	Liliaceae	√		per	her	Ge
Gagea trinervia (Viv) Greuter	Liliaceae	√		per	her	Ge
Scilla villosa Desf.	Liliaceae	√	√	per	her	Ge
Urginea autumnalis (L,) EL-Gadi	Liliaceae	√	√	per	her	Ge
Ornithogalum tenuifolium Guss	Liliaceae	√	√	per	her	Ge
Bellevalia cyrenica Maire & Weiller	Liliaceae	√		per	her	Ge
Ruscus aculeatus L.	Liliaceae	√	√	per	her	Ge
Asparagus acutifolius L.	Liliaceae	√	√	per	her	Ge
Smilax aspera L.	Liliaceae	√	√	per	her	Ge
Galium recurvum Ren ex Dc.	Rubiaceae		√	Ann	her	Th
Asperula arvensis L.	Rubiaceae		√	Ann	her	Th
Rubia peregrina L.	Rubiaceae	√	√	Per	her	He
Galium mollugo L.	Rubiaceae	√	√	Per	her	He
Galium spurium L.	Rubiaceae	√	√	Ann	her	Th
Galium aparine L.	Rubiaceae	√	√	Ann	her	Th
Galium tricornutum Dandy.	Rubiaceae	√	√	Ann	her	Th
Asperula aristata L.F.	Rubiaceae	√		Per	her	He
Galium murale (L.) All.	Rubiaceae	√	√	Ann	her	Th
Galium setaceum Lam.	Rubiaceae	√	√	Ann	her	Th
Galium verrucosum Huds.	Rubiaceae	√	√	Ann	her	Th
Putoria calabrica (L.F) DC.	Rubiaceae	√		Per	Shr	Ph
Sheradia arvensis L.	Rubiaceae		√	Ann	her	Th

Valantia hispida L.	Rubiaceae	√	√	Ann	her	Th
Valantia lanata Delile & Coss.	Rubiaceae	√	√	Ann	her	Th
Polycarpon prostratum (Forssk.) Asch. & Schweinf.	Caryophyllaceae	√		Ann	her	Th
Silene cyrenaica Maire & Weiller	Caryophyllaceae	√	√	Ann	her	Th
Silene gallica L.	Caryophyllaceae		√	Ann	her	Th
Silene behen L.	Caryophyllaceae	√	√	Ann	her	Th
Silene fruticosa L.	Caryophyllaceae		√	Per	her	He
Silene italicus (L.) Pers.	Caryophyllaceae	√	√	Per	her	He
Spergularia diandra (Guss.) Heldr & Sart.	Caryophyllaceae	√	√	Ann	her	Th
Sagina apetala Ard.	Caryophyllaceae		√	Ann	her	Th
Stellaria media (L.) Cyrill.	Caryophyllaceae	√	√	Ann	her	Th
Minuartia hybrida (Vill) Schiskin.	Caryophyllaceae	√	√	Ann	her	Th
Silene longipetetala Vent.	Caryophyllaceae	√		Per	her	He
Silene marmarica Beg&Vace.	Caryophyllaceae	√		Per	her	He
Andrachne telephioides L.	Euphorbiaceae	√	√	per	her	He
Chrozophora tinctoria L.	Euphorbiaceae	√	√	Ann	her	Th
Euphorbia characias L.	Euphorbiaceae	√		Per	her	He
Euphorbia dendroides L.	Euphorbiaceae	√		Per	her	Ph
Euphorbia peplis L.	Euphorbiaceae	√		Ann	her	Th
Euphorbia chamaesyce L.	Euphorbiaceae	√	√	Ann	her	Th
Euphorbia squamigera Lois	Euphorbiaceae	√	√	Per	Shr	Ph
Euphorbia spinosa L.	Euphorbiaceae	√	√	Per	Shr	Ph
Euphorbia pseudo-apios Maire & Weill.	Euphorbiaceae	√		Per	her	He
Euphorbia pterococca Brot.	Euphorbiaceae	√	√	Ann	her	Th
Ricinus communis L.	Euphorbiaceae	√		Per	her	Ph
Euphorbia bivonae Stend	Euphorbiaceae	√	√	Per	her	Ch
Anchusa aegyptiaca (L.) DC.	Boraginaceae		√	Ann	her	Th
Anchusa hybrida Ten.	Boraginaceae		√	Ann	her	Th
Echium angustifolium Mill.	Boraginaceae	√		Per	her	Ch
Echium humile Desf.	Boraginaceae	√		Per	her	He
Echium sabulicolum Pomel	Boraginaceae	√	√	Ann	her	Th
Echium italicum L.	Boraginaceae		√	Ann	her	Th
Echium plantagineum L	Boraginaceae	√	√	Ann	her	Th
Echium arenarium var.debile Pamp.	Boraginaceae		√	Ann	her	Th
Heliotropium hirsutissimum Grauer.	Boraginaceae	√	√	Ann	her	Th
Carex illegitima Cesate.	Cyperaceae	√	√	Per	her	Ge
Carex divisa Huds.	Cyperaceae	√		Per	her	Ge
Carex flacca Schreb.	Cyperaceae	√		Per	her	Ge
Carex distans L.	Cyperaceae		√	Per	her	Ge
Carex extersa Good.	Cyperaceae	√		Per	her	Ge
Cyperus laevigatus L.	Cyperaceae	√	√	Per	her	Ge
Cyperus fuscus L.	Cyperaceae	√		Per	her	Ge
Scirpus holoshoenus L.	Cyperaceae	√	√	Per	her	Ge
Scirpus lacustris L.	Cyperaceae	√		Per	her	Ge
Crassula vaillanvii (Willd .) Roth.	Crassulaceae		√	Ann	her	Th
Sedum lanconicum Boiss .et Held.	Crassulaceae	√	√	Per	her	He
Sedum sediforme (Jacq.) Pau.	Crassulaceae		√	Per	her	He
Sedum certense Maire	Crassulaceae	√	√	Per	her	He
Sedum mirum Pamp.	Crassulaceae	√	√	Ann	her	Th
Sedum cepaea L.	Crassulaceae		√	Ann	her	Th
Sedum bracteatum viv	Crassulaceae		√	Ann	her	Th
Sedum caespitosum (Cav.) DC.	Crassulaceae	√	√	Ann	her	Th
Umbilicus horizontalis (Guss)Dc	Crassulaceae		√	Per	her	He
Umbilicus rupestris (Salisb) Dandy	Crassulaceae	√		Per	her	He
Cistus incanus L	Cistaceae	√		Per	Shr	Ch
Cistus parviflorus Lam.	Cistaceae	√	√	Per	Shr	Ch
Cistus salviifolius L.	Cistaceae	√	√	Per	Shr	Ch

Fumana laevipea(L.)Spach.	Cistaceae	√		Per	Shr	Ch
Fumana arabica (L.) Spach	Cistaceae	√	√	Per	Shr	Ch
Fumana thymifolia (L.) Spach.	Cistaceae	√	√	Per	Shr	Ch
Helianthemum salicifolium (L.) Mill.	Cistaceae	√	√	Ann	her	Th
Helianthemum ciliatum (Deaf.)Pers.	Cistaceae	√		Ann	her	Th
Convolvulus humilus Jaeq.	Convolvulaceae	√		Per	her	He
Convolvlus althaeoides L.	Convolvulaceae	√		Per	her	He
Convolvlus oleifolus Desr.	Convolvulaceae	√	√	Ann	her	Th
Convolvulus arvensis L.	Convolvulaceae	√		Per	her	He
Convolvulus maireanum Pamp.	Convolvulaceae	√	√	Per	her	He
Convolvulus dorycnium L.	Convolvulaceae	√		Per	her	He
Erodium cicutarium (L) L.Herit.	Geraniaceae	√	√	Ann	her	Th
Erodium gruinum (L) L. Herit.	Geraniaceae	√	√	Ann	her	Th
Erodium malacoides (L.) LHerit.	Geraniaceae	√	√	Ann	her	Th
Erodium chium L.	Geraniaceae		√	Ann	her	Th
Erodium keithii Guitt .et Le Houerou.	Geraniaceae		√	Ann	her	Th
Erodium toeranum Guitt .et Le Houerou.	Geraniaceae	√	√	Ann	her	Th
Erodium touchyanum Delile.	Geraniaceae	√	√	Ann	her	Th
Erodium moschatum (L.)L Herit.	Geraniaceae	√	√	Ann	her	Th
Erodium hirtum (Frorsk.) Will	Geraniaceae	√		per	her	He
Erodium ciconium (L.) L Hert.	Geraniaceae	√	√	Ann	her	Th
Erodium neuradifolium Delile ex Godr.	Geraniaceae	√	√	Ann	her	Th
Geranium molle L.	Geraniaceae		√	Ann	her	Th
Geranium rotundifolium L.	Geraniaceae		√	Ann	her	Th
Geranium lucidum L.	Geraniaceae		√	Ann	her	Th
Geranium robertianum L.	Geraniaceae	√	√	Ann	her	Th
Linaria tarhunesis Pamp.	Scrophulariaceae	√	√	Ann	her	Th
Linaria virgata (Poir) Desf.	Scrophulariaceae		√	Ann	her	Th
Linaria arvensis (L.) Desf.	Scrophulariaceae		√	Ann	her	Th
Kickxia commulata (Bernh .ex Reichenb.)Fritsch	Scrophulariaceae	√	√	Ann	her	Th
Parentucellia floribunda Viv	Scrophulariaceae	√	√	Ann	her	Th
Scrophularia peregrina L.	Scrophulariaceae	√	√	Ann	her	Th
Antirrhinum siculum Mill.	Scrophulariaceae		√	Ann	her	Th
Verbascum lentourneuxii Asch &Schweinf.	Scrophulariaceae	√		Per	her	He
Verbascum sinuatum L.	Scrophulariaceae	√	√	Per	her	Ch
Misopates orontium (L.) Rafin.	Scrophulariaceae	√	√	Ann	her	Th
Datura fastuosa L	Solanaceae	√	√	Ann	her	Th
Datura arborea L.	Solanaceae	√		Per	Shr	Ph
Hyposcyamus allba L.	Solanaceae	√	√	Ann	her	Th
Lycium schweinfurthii Dammer.	Solanaceae	√	√	Per	Shr	Ph
Nicotiana rustica L.	Solanaceae	√	√	Ann	her	Th
Nicotiana glauca R.C.Graham	Solanaceae	√		Per	Shr	Ph
Solanum tuberosum L.	Solanaceae	√	√	Per	her	He
Solanum nigrum L.	Solanaceae	√		Ann	her	Th
Solanum sodomeum L.	Solanaceae	√		Ann	her	Th
Rananculus muricatus L	Ranunculaceae		√	Ann	her	Th
Adonis dentata Delile	Ranunculaceae	√	√	Ann	her	Th
Adonis microcarpa DC.	Ranunculaceae	√	√	Ann	her	Th
Clematis cirrhosa L.	Ranunculaceae	√		Per	her	Ph
Clematis flammula l.	Ranunculaceae	√	√	Per	her	Ph
Anemome coronaria L	Ranunculaceae	√	√	Per	her	Th
Nigella arvensisL.	Ranunculaceae		√	Ann	her	Th
Nigella damascena L.	Ranunculaceae		√	Ann	her	Th
Delphinium halteratum Sm.	Ranunculaceae		√	Ann	her	Th
Myosurus minimus L.	Ranunculaceae	√	√	Ann	her	Th
Ranunculus asiaticus L.	Ranunculaceae	√		Per	her	He
Ranunculus bullatus L.	Ranunculaceae	√		Per	her	He

Ranunculus cyclocarpus Pamp.	Ranunculaceae	√	√	Ann	her	Th
Ranunculus ficaria L.	Ranunculaceae	√	√	Per	her	He
Ranunculus macrophyllus Desf.	Ranunculaceae	√	√	Per	her	He
Allihum roseum L.	Alliaceae	√		Per	her	Ge
Allihum ampeloprasum L	Alliaceae	√	√	Per	her	Ge
Allihum orientale Boiss	Alliaceae	√		Per	her	Ge
Allihum erdelii Zuec	Alliaceae		√	Per	her	Ge
Allihum nigrum L.	Alliaceae	√	√	Per	her	Ge
Allihum schubertii Zuec	Alliaceae	√		Per	her	Ge
Allihum negrianum Maire & Weiller.	Alliaceae	√		Per	her	Ge
Allihum barthianum Asch &Schw.	Alliaceae	√	√	Per	her	Ge
Allihum paniculatum L.	Alliaceae	√	√	Per	her	Ge
Allihum ruhmerianum Asch	Alliaceae	√		Per	her	Ge
Allihum subhirsutum L.	Alliaceae	√	√	Per	her	Ge
Orchis collina Soland.	Orchidaceae	√	√	Per	her	Ge
Orchis papilionacea Linn	Orchidaceae	√	√	Per	her	Ge
Orchis simia Lamk.	Orchidaceae	√		Per	her	Ge
Ophrys bolosericea (Burm.F.)	Orchidaceae		√	Per	her	Ge
Ophrys rosea (Desf.) G.Sampaio.	Orchidaceae	√	√	Per	her	Ge
Neotinea maculata (Desf.)Stearn.	Orchidaceae	√	√	Per	her	Ge
Ophrys fusca Link	Orchidaceae	√		Per	her	Ge
Orchis italica Poir.	Orchidaceae	√		Per	her	Ge
Emex spinosa (L.) Camped	Polygonaceae		√	Ann	her	Th
Polygonum patulum M.Bieb.	Polygonaceae		√	Ann	her	Th
Polygonum salicifolium Brouss .ex Willd.	Polygonaceae	√	√	Per	her	He
Polygonum maritimum L.	Polygonaceae	√	√	Per	her	He
Polygonum aviculare L.	Polygonaceae	√	√	Ann	her	Th
Polygonum balansae Boiss.	Polygonaceae	√		Per	her	He
Rumex crispus L.	Polygonaceae	√	√	Ann	her	Th
Rumex conglomeratus Murray.	Polygonaceae	√	√	Per	her	He
Polygala aschersoniana Chodat	Polygonaceae	√	√	Per	her	Ph
Fumaria dnsiflora DC.	Fumariacea		√	Ann	her	Th
Fumaria gaillardotii Boiss	Fumariacea	√	√	Ann	her	Th
Fumaria capreolata L.	Fumariacea		√	Ann	her	Th
Fumaria parviflora L.	Fumariacea		√	Ann	her	Th
Gladiolus byzantinus Miller .	Iridaceae	√	√	per	her	Ge
Gladiolus segatum Ker. Gowl.	Iridaceae	√		per	her	Ge
Iris germanica L.	Iridaceae	√		per	her	Ge
Iris sisyrinchium L.	Iridaceae	√		per	her	Ge
Romulea cyrenaica Beguinot.	Iridaceae	√	√	per	her	Ge
Romulea bulbocodium (L.) Seb&Mauri	Iridaceae	√		per	her	Ge
Malva verticillata L.	Malvaceae	√	√	Ann	her	Th
Malva nicaeensis L.	Malvaceae		√	Ann	her	Th
Malva parviflora L.	Malvaceae	√	√	Ann	her	Th
Malva aegyptia L.	Malvaceae		√	Ann	her	Th
Malva sylvestris L.	Malvaceae	√	√	Ann	her	Th
Limoniastrum monopetalum (L.) Boiss.	Plumbaginaceae	√	√	per	her	Ch
Limonium pruinosum (L.) Chaz.	Plumbaginaceae	√		Per	her	He
Limonium tubiflorum (Delile) Kuntze	Plumbaginaceae	√		Per	her	He
Limonium oleifolium Mill.	Plumbaginaceae	√	√	Per	her	He
Limonium cyrenaicum (Rouy)Brullo.	Plumbaginaceae	√	√	Per	her	He
Reseda orientalis (Mull.) Boiss.	Resedaceae	√	√	Ann	her	Th
Reseda alba L. subsp alba	Resedaceae		√	Ann	her	Th
Reseda lutea L	Resedaceae		√	Ann	her	Th
Reseda phyteuma L.	Resedaceae	√	√	Ann	her	Th
Potenilla reptans L.	Rosaceae	√		Per	her	He
Malus sylvestris (L.) Mill.	Rosaceae		√	Per	Tre	Ph
Sanguisorba minor Scop.	Rosaceae	√	√	Per	her	He

Rubus sanctus Schreb.	Rosaceae	√		Per	her	Ph
Sacropoterium spinosum (L.) Spach	Rosaceae	√	√	Per	Shr	Ch
Urtica dioica L.	Urticaceae	√		Per	her	He
Urtica pilulifera L.	Urticaceae	√	√	Ann	her	Th
Urtica urens L.	Urticaceae	√		Per	her	He
Fagonia cretica L	Zygophyllaceae	√	√	Per	her	He
Peganum harmala L.	Zygophyllaceae	√		Per	her	He
Zygophyllum album L.	Zygophyllaceae		√	Per	Shr	Ph
Fagonia microphylla Pomal	Zygophyllaceae	√	√	Per	her	He
Zygophyllum geslinii Coss	Zygophyllaceae	√		Per	Shr	Ph
Centranthus calcitrapae (L.) Dufresne	Valerianaceae	√	√	Ann	her	Th
Feddia cornucopiae(L.) Gaetner.	Valerianaceae		√	Ann	her	Th
Feddia caput-bovis pomel.	Valerianaceae		√	Ann	her	Th
Valerianella vesicaria (L.) Moench.	Valerianaceae	√	√	Ann	her	Th
Valerianella petrovitchii Ascherson.	Valerianaceae	√	√	Ann	her	Th
Valerianella muricata (Steven)J.W.Loudon.	Valerianaceae		√	Ann	her	Th
Verbena officinalis L.	Valerianaceae	√	√	Per	her	He
Olea europaea L	Oleaceae	√		Per	Tre	Ph
Phillyrea latifolia L.	Oleaceae	√	√	Per	Tre	Ph
Phillyrea angustifolia L.	Oleaceae	√		Per	Shr	Ph
Jasminum grandiflorum L.	Oleaceae	√	√	per	Shr	Ph
Lythrum salicaria L.	Lythraceae	√		Per	her	He
Lythrum hyssopifolia L	Lythraceae	√	√	Ann	her	Th
Lythrum thymifolia L.	Lythraceae	√	√	Ann	her	Th
Linum bienne Mill.	Linaceae		√	Ann	her	Th
Linum decumbens Desf.	Linaceae		√	Ann	her	Th
Linum nodiflorum L.	Linaceae	√	√	Ann	her	Th
Linum trigynum L.	Linaceae	√	√	Ann	her	Th
Juncus acutus L.	Juncaceae	√		Per	her	Ge
Juncus bufonium L.	Juncaceae	√	√	Ann	her	Th
Juncus maritimum Lam	Juncaceae		√	Ann	her	Th
Amaranthus viridis L.	Amaryllidaceae	√	√	Ann	her	Th
Narcissus elegits(Haw.) Spach.	Amaryllidaceae	√		Per	her	Ge
Narcissus tazetta L.	Amaryllidaceae	√	√	Per	her	Ge
Pancratium maritimum L.	Amaryllidaceae	√		Per	her	Ge
Paronychia arabica (Linn) DC	ILLecebraceae	√	√	Ann	her	Th
Paronychia argentea Laimk	ILLecebraceae	√	√	Per	her	He
Paronychia chlorothyrsa Murb.	ILLecebraceae		√	Per	her	He
Herniaria cinerea DC.	ILLecebraceae		√	Ann	her	Th
Herniaria cyrenaica Hermann.	ILLecebraceae	√		Per	her	He
Herniaria glabra Linn.	ILLecebraceae	√	√	Ann	her	Th
Hypericum aegpticum L	Guttiferae	√	√	per	Shr	Ph
Hypericum empetrifolium Willd.	Guttiferae	√	√	per	Shr	Ph
Hypericum decaisnneanum Coss &Daveau.	Guttiferae		√	per	her	He
Hypericum triquetrifolium Turra.	Guttiferae		√	per	her	He
Orobanche nana (Reut.) Noe	Orobanchaceae	√	√	Ann	her	Th
Orobanche cyrenaic G.Beck.	Orobanchaceae	√	√	Ann	her	Th
Papaver rhoeas var .rhoeas	Papveraceae	√	√	Ann	her	Th
Papaver dubium L.	Papveraceae	√		Ann	her	Th
Roemeria hybrida var dodecandra (forsk) Durand&Barratte.	Papveraceae	√	√	Ann	her	Th
Glaucium flavum Cranz	Papveraceae	√	√	Per	her	He
Glaucium corniculatum (L.)Rud.	Papveraceae		√	Ann	her	Th
Plantago albicans L.	Plantaginaceae	√	√	per	her	He
Plantago cyrenaica Durand & Barrate	Plantaginaceae	√	√	Ann	her	Th
Plantago lanceolata L. Anam	Plantaginaceae	√		per	her	He

Plantago lagopus L.	Plantaginaceae	√	√	Ann	her	Th
Plantago phaeostoma Boss &Heldr	Plantaginaceae		√	Ann	her	Th
Potamogeton natans L.	Potamogetonaceae	√		Per	her	Ge
Potamogeton nodosus Poir.	Potamogetonaceae	√		Per	her	Ge
Potamogeton schweinfurthii Bennet.	Potamogetonaceae		√	Per	her	Ge
Potamogeton pusillusL.	Potamogetonaceae	√	√	Per	her	Ge
Anagullis arvensis L.	Primulaceae	√	√	Ann	her	Th
Cyclamen rohlfsianum Aschers.	Primulaceae	√		Per	her	Ge
Samolus valerandi L.	Primulaceae	√	√	per	her	He
Pterocephalus papposus (L,) Coulter.	Dipsacaceae	√	√	Ann	her	Th
Scobiosa arenaria forskal.	Dipsacaceae	√	√	Ann	her	Th
Scabiosa libyca Alavi.	Dipsacaceae		√	Ann	her	Th
Arbutus pavarii Pamp.	Ericaceae	√	√	Per	Tre	Ph
Erica multiflora L.	Ericaceae	√	√	Per	Shr	Ph
Erica sicula Guss.	Ericaceae	√		Per	Shr	Ch
Rhamnus lycioides L.	Rhamnaceae	√		Per	Shr	Ph
Rhamnus alaternus L.	Rhamnaceae	√		Per	Shr	Ph
Rhamnus oleoides L.	Rhamnaceae	√		Per	Shr	Ph
Carpobrotus acinaciforme (L.)L.Bolus	Aizoaceae	√		Per	Shr	Ph
Mesembryanthemum nodiflorum L.	Aizoaceae	√		Ann	her	Th
Pistacia lentiscus L.	Anacardiaceae	√	√	Per	Tre	Ph
Rhus tripartita (Ucria) Grande	Anacardiaceae	√		Per	Tre	Ph
Arisarum vulgare Targ.Tozz.	Araceae	√		Per	her	Ge
Arum cyrenaicum Hruby Araceae	Araceae	√		Per	her	Ge
Caralluma europaea (Guss.) N.E.Br. Adghamus	Asclepiadaceae	√	√	Per	her	He
Periploca angustifolia Labill. Helaab	Asclepiadaceae	√		Per	Shr	Ph
Viburnum tinus L.	Caprifoilaceae	√		Per	Shr	Ph
Campanula erinus L.	Campanulaceae	√	√	Ann	her	Th
Legousia falcata(Ten.) Fritsch.	Campanulaceae	√		Ann	her	Th
Cupressus sempervirens L.	Cupressaceae	√	√	Per	Tre	Ph
Juniperus phoenicea L.	Cupressaceae	√	√	Per	Tre	Ph
Centaurium pulchellum (Swartz) Druce	Gentianaceae	√	√	Ann	her	Th
Centaurium spicatum (L.) Fritsch	Gentianaceae		√	Ann	her	Th
Globularia arabica Jaub. & Spach	Globulariaceae	√	√	per	her	Ph
Globularia alypum L.	Globulariaceae	√	√	per	her	He
Laurus nobilis L.	Lauraceae	√		per	Shr	Ph
Laurus azorica (Seub) J	Lauraceae	√		Per	Shr	Ph
Cuscuta europaea L.	Cuscutaceae	√	√	Ann	her	P
Cuscuta epithymum (L.) Murray	Cuscutaceae	√	√	Ann	her	P
Oxalis articulata Savig.	Oxalidaceae	√	√	Per	her	Ge
Oxalis pes-caprae Linn	Oxalidaceae	√		Per	her	He
Epilobium hirsutum L.	Oxalidaceae	√		Per	her	Ge
Viola scorpiuroides Coss.	Violaceae		√	Per	her	He
Thesium erythronic Pamp	Salicaceae		√	Per	her	He
Saxifraga hederacea L.	Saxifragaceae		√	Ann	her	Th
Saxifraga tridactylites L.	Saxifragaceae		√	Ann	her	Th
Theligonum cynocrambe L.	Theigonaceae	√	√	Ann	her	Th
Daphne jasminea Sibth. & Sm.	Thymelaceae	√		Per	Shr	Ph
Typha domigensis Pers.	Typhaceae	√		Per	Shr	Ph
Damasonium alisma Mill.	Alismataceae	√	√	Ann	her	Th
Ilex aquifolium L.	Aquifoliaceae		√	Per	her	Ph
Nerium oleander L	Apocynaceae	√		Per	her	Ph
Ceratonia siliqua L.	Caesalpiniaceae	√		Per	Tre	Ph

Ceratophyllum demersumL.	Ceratophyllaceae	√	√	Per	her	He
Ecballium elaterium (L.) A. Rich.	Cucurbitaceae	√	√	Per	her	He
Tamus communis L.	Dioscoreaceae	√	√	Per	her	He
Elatine macropoda Guss	Elatinaceae	√	√	Ann	her	Th
Quercus coccifera L.	Fagaceae	√		Per	Tre	Ph
Hypecoum imberbe Sibth&Sm	Hypecoaceae		√	Ann	her	Th
Ficus carica L.	Moraceae	√		Per	Shr	Ph
Myrtus communis L.	Myrtaceae	√		per	Shr	Ph
Phytolacca dioica L.	Phytolaccaceae	√	√	Per	Tre	Ph
Punica granatum L.	Punicaceae	√		Per	Tre	Ph
Pinus halepensis Mill	Pinaceae	√	√	Per	Tre	Ph
Casimiroa edulis L.	Rutaceae	√	√	Per	Tre	Ph