第 48 卷 第 12 期
2021 年 12 月

湖南大学学报（自然科学版）
Journal of Hunan University（Natural Sciences）

Vol. 48 No. 12
December 2021

Open Access Article

Floristic Diversity of Karak Province and a New Record of *Consolida Hispanica* to Jordan Flora

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Abstract: This study aimed to investigate the floristic composition of Karak province, Jordan and analyze it according to life forms and chorology. This study survey the floristic diversity, life form patterns, and chorological affinities of Karak province located in the southwest part of Jordan. A total area of 2932.7 km^2 was studied using the circular grids sampling method. Each selected grid has been used for sampling using the routing and the line-transect methods. The final floristic list includes 387 species of 235 genera and 46 families. Largest families containing the greatest number of species are Compositae (18.6%), Leguminosae (9.0%), Gramineae (8.8%), Labiatae (8.5%), Cruciferae (6.5%), Caryophyllacea (4.9%), Umbelliferae (4.7%), and Boraginaceae (4.1%), followed by Chenopodiaceaee and Liliaceae (3.6%). These ten families represent 72.4% of the total families recognized in the study area, while twelve families represented the least frequent families since each one represented just only one species. Therophyte plants were the most diverse life form and accounted for about half of the recorded species (51.3%), hemicryptophytes (22.4%), chamaephyte (14.4%), and Geophytes (8.8), and the least diverse life form class was the phanerophyte shrub and tree (1.5% and 1.3%, respectively). Moreover, parasite life-form is represented only by one species; *Cynomorium coccineum*. Chorological characteristics of the recorded flora show that Mediterranean and Irano-Turanian elements constitute (67.5%) of the total flora. A *Consolida hispanica* specimen was collected and recorded for the first time to the Jordan flora during the work. This research shows that the area has high plant species diversity even with low rainfall and the dramatic expansion of urbanization and cultivation over natural habitat. Based on the obtained results, spending the farthest efforts to conserve such vegetation cover is quite recommended. In addition, we recommended further work on the unexplored area of the Karak province, especially Wadi Al-Mujib.

Keywords: Karak, life form, summer shedding, chorology, bioclimate.

卡拉克省植物區系多樣性和鞏固西班牙裔到約旦植物區系的新記錄

摘要：本研究旨在調查約旦卡拉克省的植物區系組成，並根據生命形式和植物區係對其進行分析。本研究調查了位於約旦西南部的卡拉克省的植物區系多樣性、生命形式模式和生態親緣關係。使用圓形網格採樣方法研究的總面積為2932.7平方公里。每個選定的網格都用於使用佈線和線樣方法進行採樣。最終的植物區系名錄包括46科235屬387種。物種數量最多的最大科是菊科(18.6%)、豆科(9.0%)、禾本科(8.8%)、唇形科(8.5%)、十字花科(6.5%)、石竹科(4.9%)、繖形科(4.7%),和紫草科(4.1%)，其次是藜科和百合科(3.6%)。這10個科佔研究區總科的72.4%，而12個科代表最不常見的科，因為每個科只代表一個物種。藻類植物是最多樣化的生命形式，約佔記錄物種(51.3%)、半隱生植物(22.4%)茶樹(14.4%)和土生植物(8.8)的一半，而多樣性最少的生命形式類別是顯形植物灌木和喬木（分別為1.5%和1.3%）。此外，寄生蟲生命形式僅由一個物種代表；鎖陽。記錄的植物群的年代學特徵表明，地中海和伊朗圖拉尼亞元素構成了總植物群(67.5%)。在工作期間，鞏固西班牙裔標本首次被收集並記錄到約旦植物群中。這項研究表明，即使在降雨量

Received: August 21, 2021 / Revised: October 25, 2021 / Accepted: November 18, 2021 / Published: December 30, 2021
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低以及城市化和自然棲息地耕作急劇擴張的情況下，該地區仍具有很高的植物物種多樣性。根據獲得的結果，非常建議盡最大努力保護這種植被覆蓋。此外，我們建議在卡拉克省的未開發地區進一步開展工作，尤其是穆吉布穀。

关键词：身体素质、职业倦怠、心理健康、体育教师.

1. Introduction

Jordan is a small country, about 90,000 Km², situated within the Mediterranean Climate, where typical changes in season are so clear with long dry summer, long winter, and short autumn and spring. However, the country is also classified as an arid or semiarid region since 80% of its total area is a desert [1]. Jordan is divided into four biogeographical regions regarding elevation, rainfall, and temperature: 1) Sudanian zone represents a tropical element; altitude falls to 400 m below sea level. Rainfall is 50-100 mm. The mean annual maximum temperature of 20-35°C and mean annual minimum temperatures are 10-20°C. 2) Saharo-Arabian zone (semi-desert and desert) covers the flat semi-desert and desert, with a mean altitude is 600-700 m. Annual rainfall ranges between 50-150 mm, with a mean annual maximum temperature of 15-20°C and a mean annual minimum temperature of 2-15°C. 3) Irano-Turanian zone surrounds the Mediterranean zone, associated with altitude ranges between 500-700 m, and the rainfall is between 150 to 300 mm with a mean maximum annual temperature of 15-25°C and the lowest with mean minimum annual temperature 2-5°C. 4) Mediterranean zone (Highlands) predominates in the highlands with altitudes above 700 m. This zone has the highest rainfall (300 to 600 mm) with a mean annual maximum temperature of 15-20°C, and mean minimum annual temperatures of 5-10°C [2]. These regions are characterized by a wide range of geographical and ecological conditions resulting in richness in biological diversity [3].

Jordan does not have a Flora but has annotated Checklists [4]. Al-Eisawi [5] identified more than 2543 plant species belonging to about 142 families and 868 genera. The final checklist produced for Jordan covers 2531 species belonging to about 112 families [6]; continued floristic studies of different parts of the country would help accurately assess the plant diversity of Jordan.

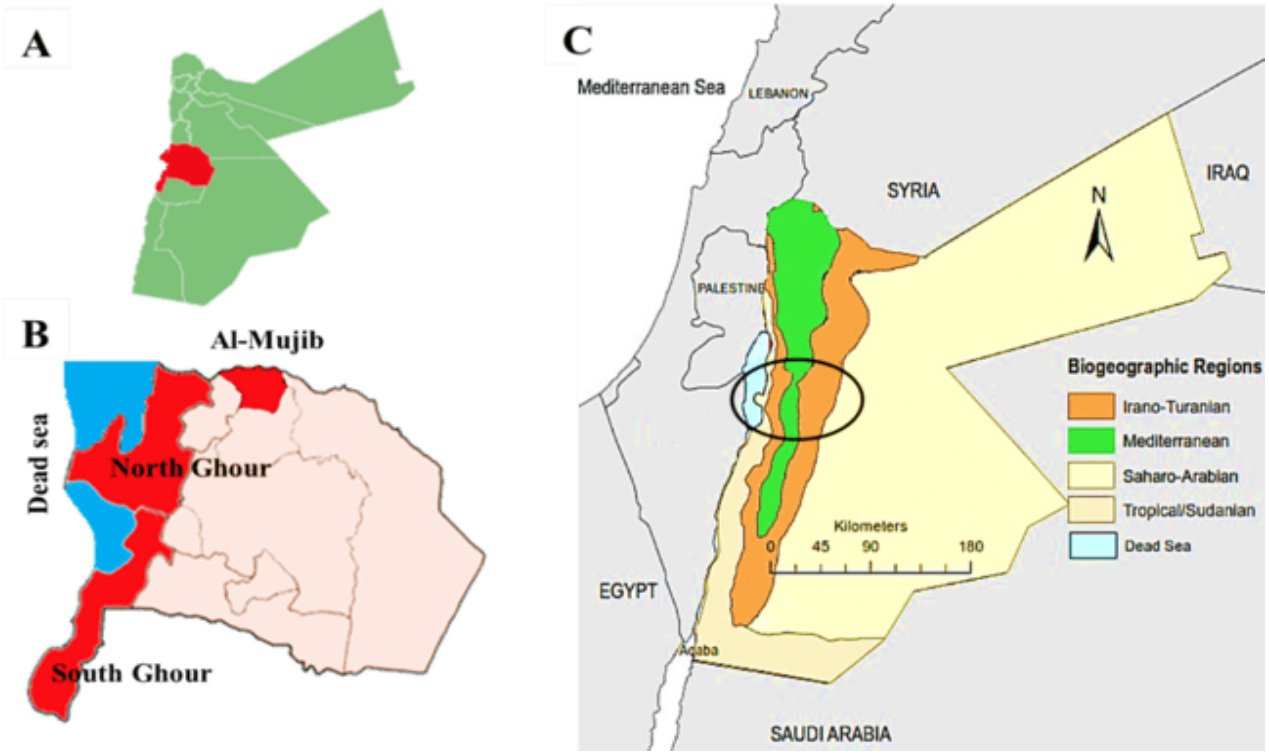

Fig. 1 A - Map of Jordan showing the location of Karak province; B - Map of Karak province counties, areas shown in red color have not been studied (Al- Gahour and Wadi Al-Mujib; C - Map of Jordan showing that Karak represents the four biogeographical regions in Jordan (after Al-Eisawi, 1996); D - Pictures taken during the study period (2018/2021)

Karak province is situated in the southern part of Jordan, and as the whole country, classified as belonging to the Mediterranean region. Karak represents the four biogeographical regions in Jordan and so characterized by its high plant diversity (Fig. 1). The highlands soil are reasonably thick but become thinner as we move east toward the. The upland soils are sufficiently moist to support grassland vegetation in most areas [7]. Valleys (Wadi in Arabic use) are usually dominated by trees and shrubs vegetation due to the availability of water almost all of the year, while near the higher elevations, water is occasionally available. However, this amount of moisture may support the growth of some trees, usually pine. Since the last assessment of Karak flora was conducted in 1995 [8], this study aimed to investigate the floristic composition of Karak province, Jordan and analyze it according to life forms and chorology. It may help to understand the vegetation status and give better recommendations and mitigations to rehabilitate the study area ecologically.

2. Materials and Methods

2.1. The Study Area

The Karak Province is located in the southern part of Jordan (31° 09' 31.80" N, 35° 45' 25.79" E), about 130 km southwest of Amman. The province's area is about 3494.7 km^2, with hilly topography in the western parts and arid desert in the east (Fig. 1 and 2). In the North, Karak is separated from Madaba by Wadi Al-Moujb and to the east is the Syrian Desert. To the south, the upland ends with the Wadi Al-Ḥasa. The Dead Sea Rift about 400 meters below sea level is situated to the west [9]. The area is characterized by diverse mountains, wadies, deserts, semi-Ghour, and Ghour regions (Fig. 2). The province has been studied except for Ghour regions (350 Km^2) and Wadi Al-Mujib (212 Km^2; Fig. 1).

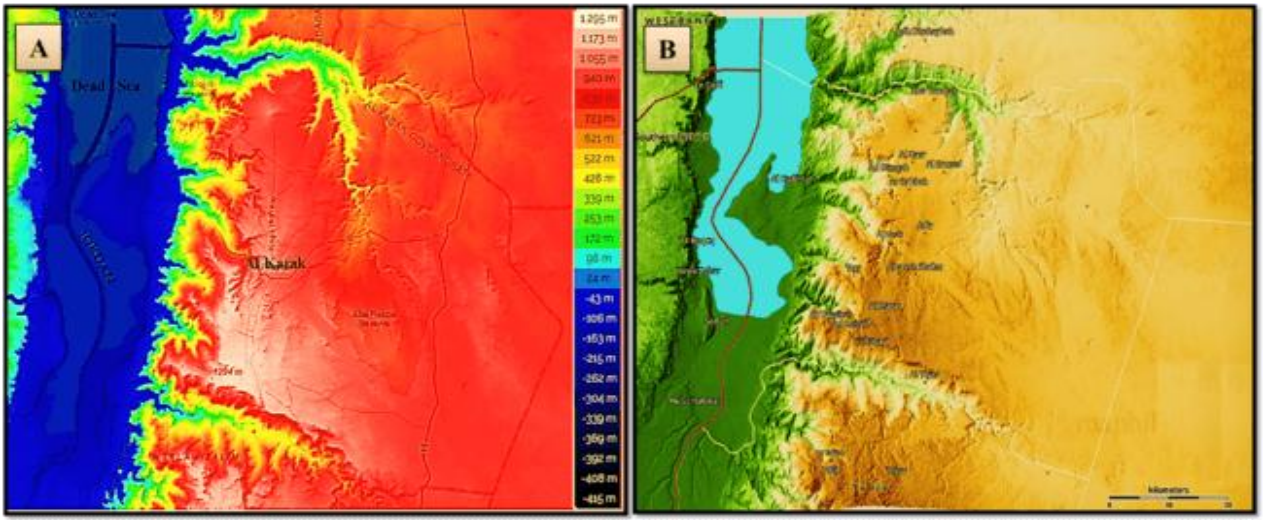

Fig. 2 A - Elevation map of the study area; B - Topography map of the study area

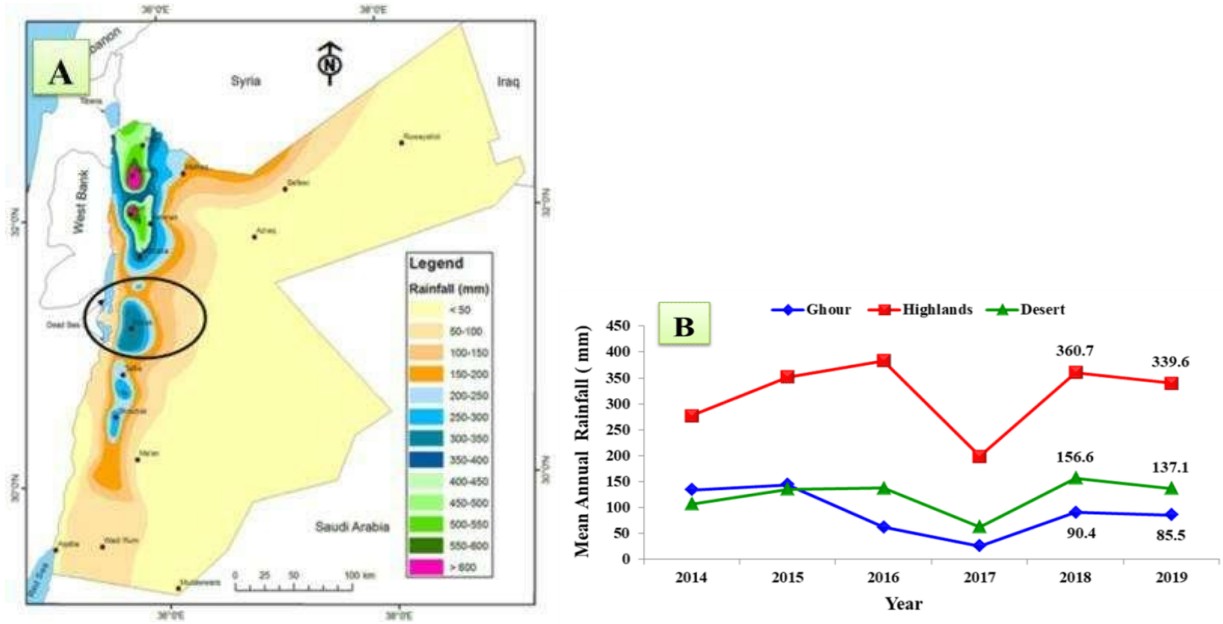

Fig. 3 A) Map show the rainfall distribution in Jordan in the study area (JMD); B) Annual Rainfall for Karak Province, 2014-2019 (Data collected from Meteorological Department/Amman/Jordan)

Karak is dry but has infrequent rainfall that occurs with intense periods, particularly during winter, including occasional snowfall. Annual rainfall fluctuates during the same season and from one year to another, with a mean annual rainfall decreasing from over 300 mm per year in the mountains to about 50 mm per year in the desert and Ghour regions (Fig. 3). January is the coldest month of the year, when the average temperature can fall below 4.3°C. The hottest months are July and August, with an average temperature of 31.8°C. The mean annual temperature is about 20°C. Summer temperatures rarely rise above 40°C, while winter temperatures may drop to 0°C (Meteorological Department/Amman/Jordan).

2.2. Data Collection

A total area of 2932.7 km^2 was studied and divided into eight radials (circular grids method of sampling). A detailed field survey includes all vascular plant taxa growing in Karak, was conducted from March 2018 to August 2020. A few more species were found during subsequent years (until April 2021) and were added to the species list. Grids falling in cultivated lands or urban areas are excluded from the survey (Fig. 4).

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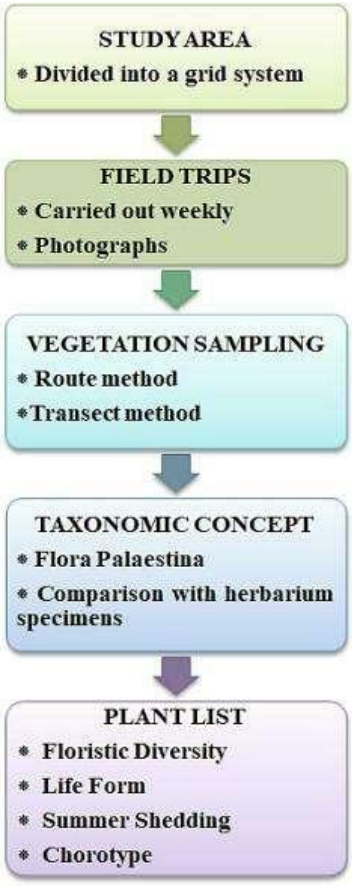

Fig. 4 Flowchart of the research methodology

Two methods were used to ensure that plant species have been recorded:

1. Route method: used to survey all plant species observed in water canals, and plant species are recorded all along that path.

2. Transect method: this method is used for surveying vegetation in open areas. A line of 500 m long was used for the survey, and all plant species touching the line were recorded [1, 10].

The taxonomic concept follows Flora Palaestina [3, 5, 6, 11, 12, 13, 14], and in comparison with University of Jordan/Amman herbarium specimens. pecimens of newly recorded plant species were collected during flowering and fruit set then deposited at the University of Jordan's Department of Biology, in the Faculty of Sciences. The classification into chorotypes and life forms followed Raunkiaer [15] and Zohary [16]. Photographs taken for some plant species in the study area were produced by the author (Figs. 1-D, 6, 7).

3. Results

3.1. Floristic Diversity

Vegetation in the study area was represented by 387 species belonging to 235 genera and 46 families (Annex 1**,** Table 1). The family Compositae (18.6%) was the richest, followed by Leguminosae (9.0%), Gramineae (8.8%, Labiatae (8.5%), Cruciferae (6.5%), Caryophyllaceae (4.9%), Umbelliferae (4.7%), Boraginaceae (4.1%), Chenopodiaceae and Liliaceae (3.6% each). These ten families represent 72.4% of the 46 families recognized in the study area. Twelve families (26%) of the total number of families are represented by one species per family, thirteen are represented by two species per family, and fifteen are represented by three species per family (Fig. 5). Fig. 6 shows photos of some selected plant species in their natural habitats in Karak.

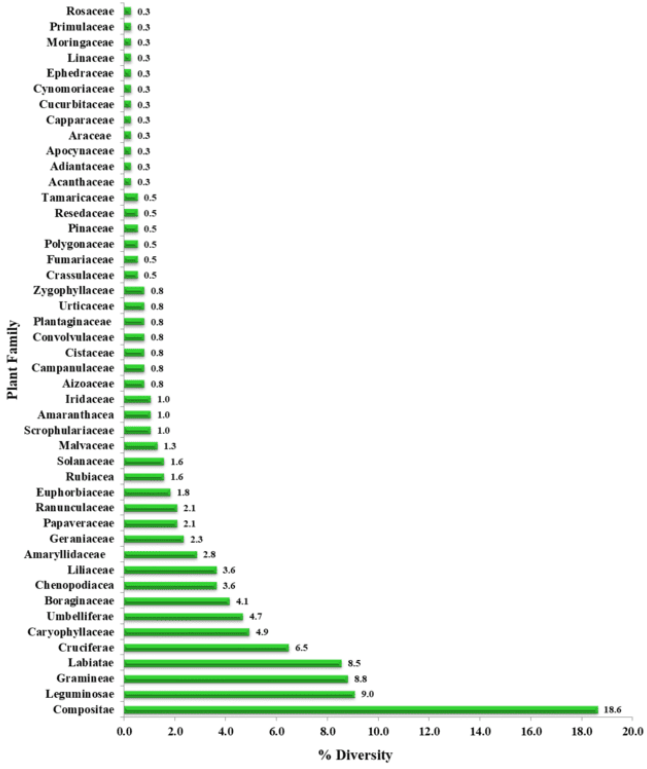

Fig. 5 Plant family diversity in Karak Province. The most diverse families are Compositae (18.6%), Leguminosae (9.0%), Gramineae (8.8%), Labiatae (8.5%), Cruciferae (6.5%), Caryophyllaceae (4.9%), Umpelliferae (4.7%), Boraginaceae (4.1%), followed by Chenopodiaceaee and Liliaceae (3.6% the same for both families). These ten families represent 69.7% of the total families recognized in the study area

Fig. 6 Selected photos of some plant species in Karak Province. A: *Cynoglossum creticum*, B: *Asteriscus graveolens*, C: *Fritillaria persica*, D: *Cynomorium coccineum*, E: *Arum hygrophilum*, F: *Chrysanthemum myconis*, G: *Fagonia mollis*, H: *Anemone coronaria*, I: *Silene colorata*, J: *Helianthemum vesicarium*, k: *Ranunculus asiaticus*, L: *Hyoscyamus aureus*, M: *Telmissa microcarpa*, N: *Ononis* natrix, O: *Ornithogalum trichophyllum*, P: *Linum mucronatum*, Q: *Lathyrus hirticarpus*, R: *Adonis dentata* S: *Allium palaestinum*, T: *Leopoldia bicolor*, U: *Sarcopoterium spinosum*, V: *Geranium molle*, W: *Iris nigricans* , X: *Scorzonera phaeopappa*

According to the Jordan plant red list [17], *Iris nigricans* is the only endemic species that have been recorded in the study area. However, some of these species are recorded as critically endangered (*Vagaria parviflora*) and endangered (e.g. *Arum hygrophilum*, *Legousia speculum-veneris*, *Anthemis maris-mortui*, *Iris nigricans*, and *Moringa peregrine*), some of them are vulnerable species (*Cousinia moabitica*, *Gundelia*

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tournefortii, Erysimum oleifolium, Origanum syriacum, Pinus halepensis and *Pimpinella corymbosa*). At the same time, both *Arundo donax* and *Foeniculum* are near-threatened species (Table 1).

During the work on the plant diversity in Karak, a *Consolida* specimen was collected. The collected specimen was compared with the description in Flora of Syria, Palestine, and Sinai [21]. However, the species have similar characteristics of *C. hispanica* (Costa) Greuter & Burdet (syn. *C. orientalis* and *Delphinium orientale*) [18]. *C. hispanica* (Ranunculaceae) is reported here for the first time in Jordan. A description and field photographs are provided in Fig. 7.

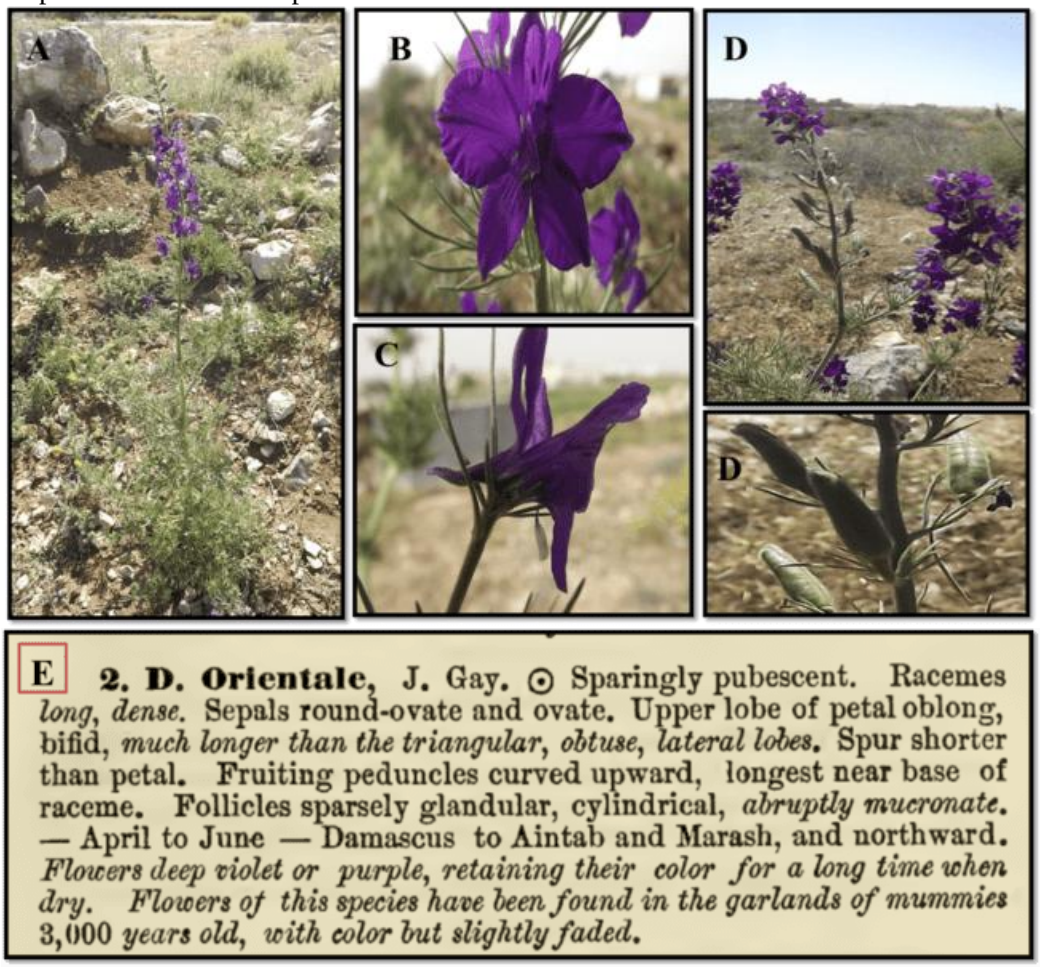

Fig. 7 A - Habitat and Inflorescence of *C. hispanica*; B - Front view of the flower; C - Lateral view of the flower; D - Follicle fruits; E - Description of *C. hispanica* (syn. *C. orientalis* and *Delphinium orientale* [21])

3.2. Plant Life Form

Considering the life forms spectrum of the study area, therophytes and hemicryptophytes were the predominant life form, constituting 67.5% and 22.5% of the total flora, respectively, followed by chamaephyte (14.5%) and geophytes (8.8%), few phanerophyte shrubs (1.5%) and trees (1.3%), and finally, the least abundant life form is a parasite which represented only by one species, *Cynomorium coccineum* (0.3%; Fig. 8).

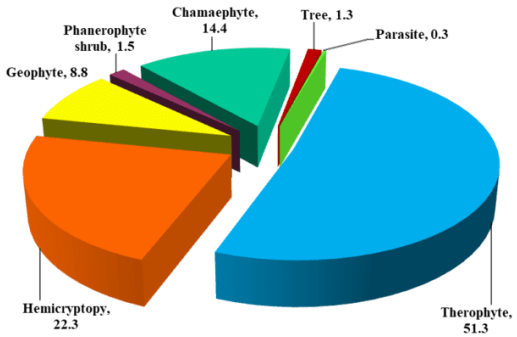

Fig. 8 Life form of plant species recorded in Karak Province checklist 2018/2021

3.3. Plant Chorological Type

Depending on chorological characteristics of the listed flora, it is clear that most recorded species

belonged to the bioregional category: 1) the Mediterranean, Mediterranean-Irano-Turanian, Irano-Turanian and Escaped from cultivation-Mediterranean-Irano-Turanian chorophyte (75.6%), 2) Saharo-Arabian, Mediterranean-Saharo-Arabian, Mediterranean-Irano-Turanian-Saharo-Arabian, Irano-Turanian-Saharo-Arabian and escaped from cultivation-Mediterranean-Saharo-Arabian chorophyte (18.7%). 3) Pluriregionalbor-trop-Tropical chorophyte (2.9%), 4) Sudania, Saharo-Arabian-Sudania chorophyte (1.2%). 5) American chorophyte (1%), and finally 6) Oro Mediterranean and Exotic-Planted-Escaped from cultivation chorophyte both comprised only by one species (0.3%; Fig. 9).

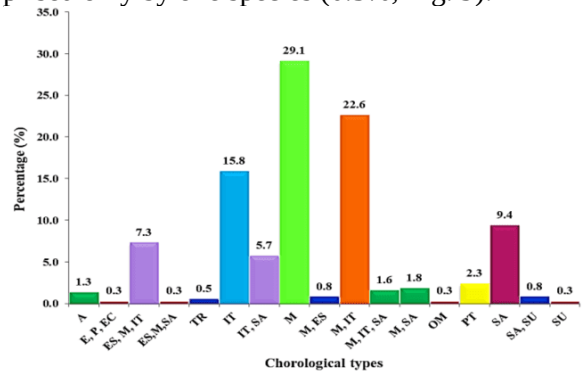

Fig. 9 Proportional percentage of chorological types of the recorded species. A, American; IT, Irano-Turanian; ES, Euro-Siberian; M, Mediterranean; SA, Saharo-Arabian; SU, Sudania; TR, Tropical; PT, Pluriregionalbor-trop; OM, Oro Mediterranean; E, Exotic; P, Planted; EC, Escaped from cultivation

4. Discussion

The floristic composition of Karak was studied. The number of species recorded in this study (387 species; Table 1) is lower than the previous studies in different province locations [8, 9, 19, 20]. The present survey confirms the presence of *Consolida hispanica* that was reported as a new record to the Jordan flora. The first species specimen was collected in Karak (31°06'40.3 "N 35°42'23.7 "E) in a deserted field during 2018 and monitored in its habitat and close environments until the end of 2019. It is not certain how this species got introduced to Karak; it could have probably been transferred with the nursery devices or other materials imported from abroad. Considering its naturalization in the adjacent countries [21], these Europe – West Asia species have been reported to be found in open habitats, usually on the disturbed ground- near arable land and roads (information was provided by the Plants of the World Online portal [22]).

Regarding floristic and vegetation composition in the studied areas, some plant families such as Compositae are represented by the highest number of species, Leguminosae, Gramineae, Labiatae, and Cruciferous coincided with the findings of [1]. They studied the vegetation of Wadi Hassan in the North East desert. This result is also similar to the whole flora of Jordan, where the highest families in the whole flora are Compositae (287 species), Leguminosae (317 species), Gramineae (266 species), Cruciferous (153 species), Labiatae (123 species) and Caryophyllaceae (122 species) are the largest with more than 100 species in each [6]. Compositae and Gramineae not only represent the largest families in Karak and the whole kingdom, but they are also among most the largest spread families of flowering plants in the world [23].

Plantlife forms of the arid and semiarid ecosystem are closely linked with topography, rainfall, and soil moisture [24, 25]. The life-form spectrum of the study area is: therophytes, followed by hemicryptophytes, chamaephyte, geophytes, phanerophyte shrub, trees, and finally parasite. The domination of therophytes, hemicryptophytes, and chamaephytes in the study area agree with the spectra of vegetation in deserts and semi-desert habitats in other parts of Jordan, as described by [1]. In addition, it is congruent with the vegetation spectra of some parts of the neighboring countries [23, 26, and 27].

Despite its small area, seventeen main chorological vegetation communities were identified in the study area concerning elevation, rainfall, and temperature (Fig. 9). The most diverse chorological type are Mediterranean elements (29.1%) of the total flora followed by the transition zone Mediterranean- Irano-Turanian elements (22.6), Irano-Turanian elements (15.8%) followed by Saharo-Arabian (9.4%; Fig. 9), this result is similar to the whole flora of Jordan [6]. Moreover, the domination of Saharo-Arabian followed by Irano-Turanian and Mediterranean regions in the study area also agreed with the findings of Obaid *et al.* [26] and Osman *et al.* [32], who studied the floristic diversity of typical desert Wadis of Saudi Arabia.

The absence of many species in the present checklist can be explained by that part of Al Karak province (Al Ghour regions and Wadi Al-Mujib) was not concluded in this study. However, from the 1990s until now, a dramatic change in land use has occurred; expansion of urbanization and cultivation over natural habitat results in the destruction of these habitats and the removal of its natural vegetation [28]. Irrational collection of herbs for medicine and overgrazing is another factor that causes destruction and loss of floral diversity in the study area [29].

Since the climate is the main factor that determines the life form composition of the community as a result of plants' adaptations to climatic conditions [23], the impact of aridity and low rainfall in Karak is quite clear. Arid plant species tend to show large yearly fluctuation in abundance and even fail to occur in some years. The present checklist shows a wide ecological range of

Compositae and Gramineae families, which can be attributed to their good adaptation to arid and semiarid regions and effective wind dispersal strategies [23].

The predominance of therophytes over phanerophyte shrubs and trees indicates that the area has a warm climate, and the habitats have been disturbed mainly by overgrazing and anthropogenic impacts [15, 30, 31]. Thus, the observed dominance of therophytes over other life forms (hemicryptophytes, chamaephytes, and geophytes show lowest percentages) appears to be a response to the low rainfall available to support a high percentage of perennials except in highlands where sufficient rainfall occurs and in wadies where sufficient soil moisture is available (Fig. 8). In the same way, the abundance of chorological type follows the amount of rainfall. According to biogeographical regions in the country, the Mediterranean zone received the highest rainfall, followed by Irano-Turanian, Saharo-Arabian, and finally Sudania zone [2, 6]. The increase in the numbers of the Mediterranean, Irano- Turanian, Saharo-Arabian, and the transition zones between these elements is noticeable.

5. Conclusion

According to climatic characteristics and geomorphological features, Karak represents a semiarid habitat of high floristic diversity. Many plant families can thrive in such conditions, of which: Compositae, Leguminosae, Gramineae, Labiatae, and Cruciferae are the most prevailing families reflecting their high adaptability and effective dispersal. In the second place, a high percentage of therophytes and hemicryptophyte over other life forms pertains to the arid bioclimate with few available microhabitats to support a high percentage of perennials.

The floristic composition of Karak forms part of a rich cultural heritage. The conservation value of Karak's flora emerges as a result of accelerated development, overgrazing, and extensive cultivation that destroyed habitats and natural vegetation in many locations. If this increased pressure on wild vegetation is not altered or relieved, the documented drift in the floristic composition will continue. Implementation of protection and conservation measures to stop the reduction of wild vegetation and reduce destructive factors should be combined with documentation of individual species status, census of rare species, identification of unknown species then in-situ and ex-situ programs to ensure the survival of endemic, threatened, and rare species.

Acknowledgment

The author is indebted to Professor Dawud Al-Eisawi for his help in reviewing most of the taxonomical issues, for his support and encouragement in this work, may his soul rest in peace.

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Annex 1.

Table 1 Plant checklist of Karak province, 387 species belong to 235 genera and 46 families, ordered alphabetically

Family	Species		Life form	Summer Shedding	Chorotype
Acanthaceae	*1.*	*Acanthus syriacus Boiss.*	Hemicryptophyte	Perennating	M
Adiantaceae	*2.*	*Adiantum capillus-veneris L.*	Hemicryptophyte	Perennating	ES, M, IT
Aizoaceae	*3.*	*Aizoon hispanicum L.*	Therophyte	Ephemeral	SA
	4.	*Mesembryanthemum nodiflorum* L.	Therophyte	Ephemeral	ES,M,SA
	5.	*Trianthema portulacastrum L.*	Therophyte	Ephemeral	A
Amaranthacea	6.	*Amaranthus albus* L.	Therophyte	Ephemeral	A
	7.	*A. blitoides* S. Wats.	Therophyte	Ephemeral	A
	8.	*Muricatus Gillies ex Hicken.*	Hemicryptophyt, Therophyte	Ephemeral	A
	9.	*Retroflexus L.*	Therophyte	Ephemeral	PT
Amaryllidaceae	*10.*	*Allium aschersonianum Barbey*	Geophyte	Ephemeral	IT
	11.	*A. erdelii Zucc.*	Geophyte	Ephemeral	M, IT
	12.	*A. neapolitanum Cirillo*	Geophyte	Ephemeral	M
	13.	*palaestinum Kollmann ex Fragman et N. Friesen*	Geophyte	Ephemeral	IT, SA
	14.	*A. rothii Zucc.*	Geophyte	Ephemeral	IT
	15.	*A. daninianum Brullo, Pavone & Salmeri*	Geophyte	Ephemeral	M, IT
	16.	*A. truncatum (Feinbrun) Kollmann & D.Zohary*	Geophyte	Ephemeral	M
	17.	*Ixiolirion tataricum (Pall.) Herbert*	Geophyte	Ephemeral	IT
	18.	*Ornithogalum trichophyllum Boiss. & Heldr.*	Geophyte	Ephemeral	IT, SA
	19.	*Sternbergia clusiana (Ker Gawler) Spreng.*	Geophyte	Ephemeral	M, IT
	20.	*Vagaria parviflora (Desf. ex Delile) Herb.*	Geophyte	Ephemeral	M
Apocynaceae	*21.*	*Nerium oleander L.*	Phanerophyte shrub	Perennating	M
Araceae	*22.*	*Arum hygrophilum Boiss.*	Geophyte	Ephemeral	M
Boraginaceae	23.	*Alkanna galilaea Boiss.*	Chamaephyte	Perennating	M
	24.	*orientalis (L.) Boiss.*	Chamaephyte	Perennating	M, IT
	25.	*strigosa Boiss. & Hohen.*	Chamaephyte	Perennating	M
	26.	*Anchusa aegyptiaca (L.) DC.*	Hemicryptophyte	Perennating	SA
	27.	*A . strigosa Banks & Sol.*	Hemicryptophyte	Perennating	M, IT
	28.	*undulata L.*	Hemicryptophyte	Ephemeral	M
	29.	*Asperugo procumbens L.*	Therophyte	Ephemeral	ES, M, IT
	30.	*Buglossoides arvensis (L.) I.M.Johnst.*	Therophyte	Ephemeral	ES, M, IT
	31.	*Cynoglossum creticum Mill.*	Hemicryptophyte	Ephemeral	M, IT
	32.	*Echium judaeum Lacaita*	Therophyte	Ephemeral	M
	33.	*E. plantagineum L.*	Therophyte	Ephemeral	M
	34.	*Heliotropium rotundifolium Lehm.*	Chamaephyte	Perennating	IT
	35.	*Nonea melanocarpa Boiss.*	Therophyte	Ephemeral	IT
	36.	*Onosma aaronsohnii Feinbrun*	Hemicryptophyte	Ephemeral	IT
	37.	*Podonosma orientalis (L.) Feinbrun*	Chamaephyte	Perennating	M, IT
	38.	*Symphytum palaestinum Boiss.*	Hemicryptophyte	Ephemeral	M
Campanulaceae	*39.*	*Campanula stellaris Boiss.*	Therophyte	Ephemeral	M
	40.	*C. strigosa Banks & Sol.*	Therophyte	Ephemeral	M, IT
	41.	*Legousia speculum-veneris (L.) Chaix*	Therophyte	Ephemeral	ES, M, IT

Capparaceae	42.	*Capparis spinosa var. aegyptia*	Chamaephyte, Hemicryptophyte	Perennating	M
Caryophyllaceae	*43.*	*Arenaria leptoclados (Rchb.) Guss.*	Therophyte	Ephemeral	ES, M, IT
	44.	*Gymnocarpus fruticosum (Vahl) Pers.*	Chamaephyte	Perennating	SA
	45.	*Gypsophila arabica Barkoudah*	Chamaephyte	Perennating	IT
	46.	*Herniaria hirsuta L.*	Therophyte	Ephemeral	ES, M, IT
	47.	*Dianthus judaicus Boiss.*	Hemicryptophyte	Perennating	IT
	48.	*D. strictus Banks & Sol.*	Hemicryptophyte	Perennating	M
	49.	*Minuartia picta (Sibth. & Sm.) Bornm.*	Therophyte	Ephemeral	IT
	50.	*Paronychia argentea Lam.*	Hemicryptophyte	Perennating	M
	51.	*P. sinaica Fresen.*	Hemicryptophyte	Perennating	IT
	52.	*P. arabica (L.) DC.*	Hemicryptophyt, Therophyte	Ephemeral	SA
	53.	*Silene aegyptiaca (L.) L. f.*	Therophyte	Ephemeral	M
	54.	*S. apetala Willd.*	Therophyte	Ephemeral	M, IT
	55.	*S. colorata Poir.*	Therophyte	Ephemeral	M
	56.	*S. coniflora Otth*	Therophyte	Ephemeral	IT
	57.	*S. conoidea L.*	Therophyte	Ephemeral	M, IT
	58.	*S. damascena Boiss. & Gaill.*	Therophyte	Ephemeral	M
	59.	*S. palaestina Boiss.*	Therophyte	Ephemeral	M
	60.	*S. vulgaris (Moench) Garcke*	Hemicryptophyte	Ephemeral	ES, M, IT
	61.	*Vaccaria hispanica (Mill.) Rauschert*	Therophyte	Ephemeral	M
Chenopodiaceaee	*62.*	*Anabasis articulata (Forssk.) Moq.*	Chamaephyte	Perennating	SA
	63.	*A. setifera Moq.*	Chamaephyte	Perennating	SA
	64.	*syriaca Iljin*	Chamaephyte	Perennating	IT
	65.	*Atriplex halimus L.*	Phanerophyte shrub	Perennating	M, SA
	66.	*A. leucoclada Boiss.*	Chamaephyte	Perennating	IT, SA
	67.	*A. palaestina Boiss.*	Chamaephyte	Perennating	IT, SA
	68.	*A. rosea L.*	Therophyte	Ephemeral	M
	69.	*Chenopodium murale L.*	Therophyte	Ephemeral	PT
	70.	*Halothamnus acutifolius (Moq.) Botsch*	Chamaephyte	Perennating	IT
	71.	*Noaea mucronata (Forssk.) Asch. & Schweinf.*	Chamaephyte	Perennating	IT
	72.	*Salsola autrani Post*	Therophyte	Ephemeral	IT
	73.	*S. incanescens C.A.Mey.*	Therophyte	Ephemeral	SA
	74.	*S. vermiculata L.*	Chamaephyte	Perennating	IT, SA
	75.	*Suaeda asphaltica (Boiss.) Boiss.*	Chamaephyte	Perennating	SA
Cistaceae	*76.*	*Helianthemum lippii (L.) Dum.Cours.*	Chamaephyte	Perennating	SA, SU
	77.	*H. salicifolium (L.) Mill.*	Therophyte	Ephemeral	ES, M, IT
	78.	*H. vesicarium Boiss.*	Chamaephyte	Perennating	IT
Compositae	79.	*Achillea aleppica DC.*	Chamaephyte	Perennating	IT
	80.	*falcata L.*	Chamaephyte	Perennating	IT
	81.	*fragrantissima* (Forssk.) Sch. Bip	Hemicryptophyte	Perennating	IT, SA
	82.	*santolina L.*	Hemicryptophyte	Ephemeral	IT
	83.	*Anthemis maris-mortui Eig*	Therophyte	Ephemeral	SA
	84.	*A. melampodina Delile*	Therophyte	Ephemeral	SA
	85.	*A. palestina Boiss.*	Therophyte	Ephemeral	M
	86.	*Artemisia sieberi Besser*	Chamaephyte	Perennating	IT
	87.	*Aster subulatus Michx.*	Biennial, Therophyte	Ephemeral	A
	88.	*Asteriscus graveolens (Forssk.) Less.*	Chamaephyte	Perennating	SA

89.	*A. spinosus (L.) Sch.Bip.*	Hemicryptophyte	Ephemeral	M
90.	*Atractylis serratuloides Cass.*	Chamaephyte	Perennating	SA
91.	*Carlina hispanica Lam.*	Hemicryptophyte	Ephemeral	M
92.	*Calendula arvensis L.*	Therophyte	Ephemeral	M, IT
93.	*C. tripterocarpa Rupr.*	Therophyte	Ephemeral	SA
94.	*Carduus australis L.f.*	Therophyte	Ephemeral	IT
95.	*Carthamus nitidus Boiss.*	Therophyte	Ephemeral	SA
96.	*C.tenuis (Boiss. & Blanche) Bornm.*	Therophyte	Ephemeral	M
97.	*Centaurea calcitrapella Bornm. & Dinsm.*	Therophyte	Ephemeral	SA
98.	*C. eryngioides Lam.*	Hemicryptophyte	Ephemeral	IT
99.	*C. hyalolepis Boiss.*	Therophyte	Ephemeral	M, IT
100.	*C. iberica Spreng.*	Therophyte	Ephemeral	M, IT
101.	*Chardinia orientalis (L.) Kuntze*	Therophyte	Ephemeral	IT
102.	*Chrysanthemum coronarium L.*	Therophyte	Ephemeral	M
103.	*C. myconis L.*	Therophyte	Ephemeral	M
104.	*Cichorium pumilum Jacq.*	Therophyte	Ephemeral	M, IT
105.	*Cousinia moabitica Bornm. & Nabelek*	Hemicryptophyte	Ephemeral	IT
106.	*Crepis aspera L.*	Therophyte	Ephemeral	M
107.	*C. sancta (L.) Bornm.*	Therophyte	Ephemeral	M, SA
108.	*Dittrichia viscosa (L.) Greuter*	Chamaephyte	Perennating	M
109.	*Echinops adenocaulos Boiss.*	Chamaephyte, Hemicryptophyte	Perennating	M
110.	*E. polyceras Boiss*	Hemicryptophyte	Ephemeral	IT
111.	*Filago contracta (Boiss.) Chrtek & Holub*	Therophyte	Ephemeral	IT
112.	*F. desertorum Pomel*	Therophyte	Ephemeral	IT, SA
113.	*F. palaestina (Boiss.) Chrtek & Holub*	Therophyte	Ephemeral	IT
114.	*Gundelia tournefortii L.*	Hemicryptophyte	Ephemeral	IT
115.	*Hedypnois rhagadioloides (L.) F.W.Schmidt*	Therophyte	Ephemeral	M
116.	*Launaea nudicaulis (L.) Hook.f.*	Hemicryptophyte	Perennating	SA
117.	*Lactuca aculeata Boiss.*	Therophyte	Ephemeral	IT
118.	*L. undulata Ledeb.*	Therophyte	Ephemeral	IT
119.	*L. orientalis (Boiss.) Boiss.*	Chamaephyte	Perennating	IT
120.	*L. saligna L.*	Therophyte	Ephemeral	M, IT, SA
121.	*L. serriola L.*	Therophyte	Ephemeral	ES, M, IT
122.	*Leontodon laciniatus (Bertol.) Widder*	Therophyte	Ephemeral	IT, SA
123.	*L. tuberosus L.*	Hemicryptophyte	Ephemeral	M
124.	*Leysera leyseroides (Desf.) Maire*	Therophyte	Ephemeral	SA, SU
125.	*Matricaria aurea (Loefl.) Sch.Bip.*	Therophyte	Ephemeral	M, IT
126.	*Notobasis syriaca (L.) Cass.*	Therophyte	Ephemeral	M
127.	*Onopordum alexandrinum Boiss.*	Hemicryptophyte	Ephemeral	IT, SA
128.	*O. ambiguum Fresen*	Hemicryptophyte	Ephemeral	IT, SA
129.	*O. macrocephalum Eig*	Hemicryptophyte	Ephemeral	IT
130.	*O. palaestinum Eig*	Hemicryptophyte	Ephemeral	M, IT
131.	*Phagnalon rupestre (L.) DC.*	Chamaephyte	Perennating	M, IT
132.	*Picnomon acarna (L.) Cass.*	Therophyte	Ephemeral	M, IT
133.	*Reichardia tingitana (L.) Roth*	Therophyte	Ephemeral	M, IT
134.	*Rhagadiolus stellatus (L.) Gaertn.*	Therophyte	Ephemeral	M, IT
135.	*Scolymus maculatus L.*	Therophyte	Ephemeral	M

	136.	*Scorzonera judaica Eig*	Hemicryptophyte	Ephemeral	IT
	137.	*S. Scorzonera phaeopappa (Boiss.) Boiss.*	Hemicryptophyte	Ephemeral	M
	138.	*Senecio leucanthemifolius subsp. vernalis Poir.*	Therophyte	Ephemeral	M, IT
	139.	*Silybum marianum (L.) Gaertn.*	Therophyte	Ephemeral	M, IT
	140.	*Sonchus maritimus L.*	Hemicryptophyte	Perennating	M, IT
	141.	*S. oleraceus L.*	Therophyte	Ephemeral	ES, M, IT
	142.	*S. suberosus Zohary & P.H.Davis*	Chamaephyte	Perennating	SA
	143.	*S. tenerrimus L.*	Therophyte	Ephemeral	M, IT
	144.	*Taraxacum cyprium H. Lindb.*	Hemicryptophyte	Ephemeral	M
	145.	*Tolpis virgata (Desf.) Bertol.*	Hemicryptophyte	Perennating	M
	146.	*Tragopogon coelesyriacus Boiss.*	Hemicryptophyte	Ephemeral	M, IT
	147.	*T. collinus DC.*	Hemicryptophyte	Ephemeral	IT
	148.	*Urospermum picroides (L.) F.W.Schmidt*	Therophyte	Ephemeral	M, IT
	149.	*Varthemia iphionoides Boiss. & Blanche*	Chamaephyte	Perennating	M
	150.	*Xanthium spinosum L.*	Therophyte	Ephemeral	PT
Convolvulaceae	151.	*Convolvulus althaeoides L.*	Geophyte, climber	Ephemeral	M
	152.	*C. arvensis L.*	Geophyte, climber	Ephemeral	PT
	153.	*C. dorycnium L.*	Hemicryptophyte	Ephemeral	M
Cruciferae	*154.*	*Alyssum strigosum Banks & Sol.*	Therophyte	Ephemeral	M, IT
	155.	*Arabis alpina L.*	Hemicryptophyte	Perennating	M, IT
	156.	*Biscutella didyma L.*	Therophyte	Ephemeral	M, IT
	157.	*Cardaria draba (L.) Desv.*	Therophyte	Ephemeral	M, IT
	158.	*Clypeola jonthlaspi L.*	Therophyte	Ephemeral	M, IT
	159.	*Crambe orientalis L.*	Hemicryptophyte	Ephemeral	IT
	160.	*Diplotaxis erucoides (L.) DC.*	Therophyte	Ephemeral	M
	161.	*D. harra (Forssk.) Boiss.*	Chamaephyte, Hemicryptophyte, Therophyte	Ephemeral	SA
	162.	*Eruca sativa Mill.*	Therophyte	Ephemeral	-
	163.	*Erucaria boveana Coss.*	Therophyte	Ephemeral	SA
	164.	*E. microcarpa Boiss.*	Therophyte	Ephemeral	SA
	165.	*E. hispanica (L.) Druce*	Therophyte	Ephemeral	M
	166.	*Erysimum oleifolium J.Gay*	Hemicryptophyte	Ephemeral	M, IT
	167.	*Hirschfeldia incana (L.) Lagr.-Foss.*	Therophyte	Ephemeral	M, IT
	168.	*Lepidium aucheri Boiss.*	Therophyte	Ephemeral	IT
	169.	*Matthiola aspera Boiss.*	Therophyte	Ephemeral	SA
	170.	*Nasturtium officinale R. Br.*	Hemicryptophyte	Ephemeral	PT
	171.	*Sinapis alba L.*	Therophyte	Ephemeral	ES, M, IT
	172.	*S. arvensis L.*	Therophyte	Ephemeral	M
	173.	*Sisymbrium erysimoides Desf.*	Therophyte	Ephemeral	M, SA
	174.	*S.irio L.*	Therophyte	Ephemeral	M, SA
	175.	*S. runcinatum Lag. ex DC.*	Therophyte	Ephemeral	IT
	176.	*Strigosella africana (L.) W.T. Aiton*	Therophyte	Ephemeral	IT, SA
	177.	*Thlaspi perfoliatum L.*	Therophyte	Ephemeral	M, IT
	178.	*Torularia torulosa (Desf.) O.E. Schulz*	Therophyte	Ephemeral	IT
Cucurbitaceae	*179.*	*Ecballium elaterium (L.) A.Rich.*	Hemicryptophyte	Perennating	M, IT
Crassulaceae	*180.*	*Telmissa microcarpa (Sm.) Boiss.*	Therophyte	Ephemeral	M
	181.	*Umbilicus intermedius Boiss.*	Geophyte	Ephemeral	M, IT
Cynomoriaceae	*182.*	*Cynomorium coccineum L.*	Hemicryptophyte, Parasite	Ephemeral	M, IT, SA

Ephedraceae	*183.*	*Ephedra aphylla Forssk.*	Climber, phanerophyte shrub	Perennating	SA
Euphorbiaceae	184.	Chrozophora obliqua (Vahl) A.Juss. ex Spreng.	Therophyte	Ephemeral	M, IT
	185.	*C. tinctoria (L.) Raf.*	Therophyte	Ephemeral	M, IT
	186.	*Euphorbia chamaepeplus Boiss. & Gaill.*	Therophyte	Ephemeral	IT, SA
	187.	*E. falcata L.*	Therophyte	Ephemeral	M, IT
	188.	*E. hierosolymitana Boiss.*	Chamaephyte	Perennating	M
	189.	*E. peplus L.*	Therophyte	Ephemeral	ES, M, IT
	190.	*Mercurialis annua L.*	Therophyte	Ephemeral	M, ES
Fumariaceae	*191.*	*Fumaria densiflora DC.*	Therophyte	Ephemeral	M
	192.	*F. judaica Boiss.*	Therophyte	Ephemeral	M
Geraniaceae	*193.*	*Geranium molle L.*	Therophyte	Ephemeral	M, ES
	194.	*G. tuberosum L.*	Geophyte	Ephemeral	ES, M, IT
	195.	*Erodium acaule (L.) Becherer & Thell.*	Hemicryptophyte	Ephemeral	M
	196.	*E. cicutarium (L.) L'Her.*	Therophyte	Ephemeral	ES, M, IT
	197.	*E. gruinum (L.) L'Her.*	Therophyte	Ephemeral	M
	198.	*E. malacoides (L.) L'Her.*	Therophyte	Ephemeral	M, IT
	199.	*E. moschatum (L.) L'Her.*	Therophyte	Ephemeral	M, IT
	200.	*E. oxyrhinchum M.Bieb.*	Therophyte	Ephemeral	SA, SU
	201.	*E. touchyanum Delile*	Therophyte	Ephemeral	SA
Gramineae	*202.*	*Aegilops kotschyi Boiss.*	Therophyte	Ephemeral	IT, SA
	203.	*Arundo donax L.*	Geophyte, Phanerophyte shrub	Perennating	M, IT
	204.	*Avena sterilis L.*	Therophyte	Ephemeral	M, IT
	205.	*Brachypodium distachyon (L.) P.Beauv.*	Therophyte	Ephemeral	M, IT
	206.	*Bromus fasciculatus C.Presl*	Therophyte	Ephemeral	M
	207.	*B.lanceolatus Roth*	Therophyte	Ephemeral	M, IT
	208.	*B. rubens L.*	Therophyte	Ephemeral	M, IT, SA
	209.	*scoparius L.*	Therophyte	Ephemeral	M, IT
	210.	*B. tectorum L.*	Therophyte	Ephemeral	M, IT, SA
	211.	*Catapodium rigidum (L.) C.E.Hubb.*	Therophyte	Ephemeral	M
	212.	*Cenchrus ciliaris L.*	Chamaephyte, Geophyte, Hemicryptophyte	Perennating	SA
	213.	*Crithopsis delileana (Schult. & Schult.f.) Roshev.*	Therophyte	Ephemeral	M, IT
	214.	*Cynodon dactylon (L.) Pers.*	Geophyte, Hemicryptophyte	Perennating	PT
	215.	*Cynosurus effusus Link*	Therophyte	Ephemeral	M, IT
	216.	*Dactylis glomerata L.*	Hemicryptophyte	Ephemeral	ES, M, IT
	217.	*Hordeum bulbosum L.*	Hemicryptophyte	Ephemeral	M, IT
	218.	*H. glaucum Steud.*	Therophyte	Ephemeral	M, IT
	219.	*H. spontaneum K.Koch*	Therophyte	Ephemeral	M, IT
	220.	*Hyparrhenia hirta (L.) Stapf*	Therophyte	Ephemeral	M, IT, SA
	221.	*Lamarckia aurea (L.) Moench*	Therophyte	Ephemeral	M, IT
	222.	*Loliolum orientale (Boiss.) Krecz. & Bobrov*	Therophyte	Ephemeral	IT
	223.	*Lolium rigidum Gaudin*	Therophyte	Ephemeral	M, IT
	224.	*Phalaris aquatica L.*	Hemicryptophyte	Ephemeral	M
	225.	*P. minor Retz.*	Therophyte	Ephemeral	M, IT
	226.	*Piptatherum miliaceum (L.) Coss.*	Chamaephyte, Geophyte, Hemicryptophyte	Perennating	M
	227.	*Poa bulbosa L.*	Hemicryptophyte	Ephemeral	ES, M, IT
	228.	*P. eigii Feinbrun*	Hemicryptophyte	Ephemeral	IT
	229.	*P. sinaica Steud.*	Hemicryptophyte	Ephemeral	IT

	230.	*Polypogon viridis (Gouan) Breistr.*	Hemicryptophyte	Perennating	M, IT
	231.	*Saccharum ravennae (L.) Murray*	Hemicryptophyte	Perennating	M, IT
	232.	*Schismus arabicus Nees*	Therophyte	Ephemeral	IT, SA
	233.	*Stipa capensis Thunb.*	Therophyte	Ephemeral	IT, SA
	234.	*Psilurus incurvus (Gouan) Schinz & Thell.*	Therophyte	Ephemeral	M, IT
	235.	*Rostraria smyrnacea (Trin.) H. Scholz*	Therophyte	Ephemeral	M, IT
Iridaceae	*236.*	*Crocus cancellatus Herbert*	Geophyte	Ephemeral	M, IT
	237.	*Gladiolus atroviolaceus Boiss.*	Geophyte	Ephemeral	IT
	238.	*Iris nigricans Dinsm.*	Geophyte	Ephemeral	IT
	239.	*Moraea sisyrinchium (L.) Ker-Gawler*	Geophyte	Ephemeral	M, IT
Labiatae	*240.*	*Ajuga chamaepitys (L.) Schreber subsp. chia (Schreber) Arcangeli*	Hemicryptophyte	Perennating	M, IT
	241.	*A. orientalis L.*	Hemicryptophyte	Ephemeral	M
	242.	*A. tridactylites Bentham.*	Phanerophyte shrub	Perennating	IT
	243.	*Ballota undulata (Sieber ex Fresen.) Benth.*	Chamaephyte	Perennating	M
	244.	*Eremostachys laciniata (L.) Bung*	Hemicryptophyte	Ephemeral	M, IT
	245.	*Lamium moschatum Mill.*	Therophyte	Ephemeral	M
	246.	*L. amplexicaule L.*	Therophyte	Ephemeral	ES, M, IT
	247.	*Marrubium vulgare L*	Chamaephyte	Perennating	M, IT
	248.	*Mentha longifolia L.*	Hemicryptophyte	Perennating	ES, M, IT
	249.	*Micromeria nervosa Desf.*	Chamaephyte	Perennating	M
	250.	*Moluccella laevis L.*	Therophyte	Ephemeral	M
	251.	*Origanum dayi Post*	Chamaephyte	Perennating	IT
	252.	*O. syriacum L.*	Chamaephyte	Perennating	M
	253.	*Phlomis brachyodon (Boiss.) Zohary*	Chamaephyte	Perennating	IT
	254.	*P. platystegia Post*	Chamaephyte	Perennating	IT
	255.	*Salvia deserti Decne.*	Chamaephyte	Perennating	SA
	256.	*S. dominica L.*	Chamaephyte	Perennating	M
	257.	*S. palaestina Benth.*	Hemicryptophyte	Ephemeral	M, IT
	258.	*S. spinosa L.*	Hemicryptophyte	Ephemeral	IT
	259.	*S. verbenaca L.*	Hemicryptophyte	Ephemeral	M
	260.	*S. viridis L.*	Therophyte	Ephemeral	M
	261.	*Stachys aegyptiaca Pers.*	Chamaephyte	Perennating	SA
	262.	*Teucrium capitatum L.*	Chamaephyte	Perennating	M, IT
Leguminosae	*263.*	*Astragalus asterias Hohen*	Therophyte	Ephemeral	M, SA
	264.	*A. bethlehemiticus Boiss.*	Chamaephyte	Perennating	IT
	265.	*A. bombycinus Boiss.*	Therophyte	Ephemeral	SA
	266.	*A. callichrous Boiss.*	Therophyte	Ephemeral	SA
	267.	*A. tribuloides Delile*	Therophyte	Ephemeral	IT, SA
	268.	*Coronilla scorpioides (L.) W.D.J.Koch*	Therophyte	Ephemeral	M
	269.	*Hippocrepis unisiliquosa L.*	Therophyte	Ephemeral	M
	270.	*Hymenocarpos circinnatus (L.) Savi*	Therophyte	Ephemeral	M
	271.	*Lathyrus blepharicarpos Boiss.*	Therophyte, climber	Ephemeral	M
	272.	*L. erectus Lag*	Therophyte	Ephemeral	M, IT
	273.	*L. hirticarpus Mattatia & Heyn*	Therophyte, climber	Ephemeral	M
	274.	*L. pseudocicera Pamp.*	Therophyte, climber	Ephemeral	M
	275.	*Lotus peregrinus L.*	Therophyte	Ephemeral	M
	276.	*Medicago coronata (L.) Bartal.*	Therophyte	Ephemeral	M

	277.	*M. laciniata (L.) Mill.*	Therophyte	Ephemeral	SA
	278.	*M. monspeliaca (L.) Trautv.*	Therophyte	Ephemeral	M
	279.	*M. orbicularis (L.) Bartal.*	Therophyte	Ephemeral	M, IT
	280.	*M. polymorpha L.*	Therophyte	Ephemeral	ES, M, IT
	281.	*M. sativa L.*	Hemicryptophyte	Perennating	ES, M, IT
	282.	*Ononis natrix L.*	Chamaephyte	Perennating	M
	283.	*O. sicula Guss.*	Therophyte	Ephemeral	M, IT, SA
	284.	*O. spinosa L.*	Hemicryptophyte	Perennating	M, IT
	285.	*Pisum syriacum (Berg.) Lehm.*	Therophyte, climber	Ephemeral	IT
	286.	*Retama raetam (Forssk.) Webb*	Phanerophyte shrub	Perennating	SA
	287.	*Trifolium angustifolium L.*	Therophyte	Ephemeral	M
	288.	*T. campestre Schreb.*	Therophyte	Ephemeral	M
	289.	*T. dasyurum C.Presl*	Therophyte	Ephemeral	M
	290.	*T. clusii Godr. & Gren.*	Therophyte	Ephemeral	M
	291.	*T. purpureum Loisel.*	Therophyte	Ephemeral	M
	292.	*T. resupinatum L.*	Therophyte	Ephemeral	M, IT
	293.	*T. stellatum L.*	Therophyte	Ephemeral	M
	294.	*Trigonella brachycarpa (M.Bieb.) Moris*	Therophyte	Ephemeral	OM
	295.	*T. schlumbergeri Boiss.*	Therophyte	Ephemeral	SA
	296.	*T. stellata Forssk.*	Therophyte	Ephemeral	SA
	297.	*Vicia sativa L.*	Therophyte, climber	Ephemeral	M
Liliaceae	*298.*	*Asphodeline lutea (L.) Rchb.*	Hemicryptophyte	Ephemeral	M
	299.	*Asphodelus fistulosus L.*	Hemicryptophyte	Ephemeral	M
	300.	*A. ramosus L.*	Hemicryptophyte	Ephemeral	M
	301.	*Bellevalia flexuosa Boiss.*	Geophyte	Ephemeral	M
	302.	*Colchicum tunicatum Feinbrun*	Geophyte	Ephemeral	IR
	303.	*Fritillaria persica L.*	Geophyte	Ephemeral	M, IT
	304.	*Gagea reticulata (Pall.) Schult. & Schult.f.*	Geophyte	Ephemeral	IR
	305.	*Leopoldia bicolor (Boiss.) Eig & Feinbrun*	Geophyte	Ephemeral	M
	306.	*L. comosa (L.) Parl.*	Geophyte	Ephemeral	M, IT
	307.	*Muscari inconstrictum Rech.f.*	Geophyte	Ephemeral	M, IT
	308.	*M. neglectum Ten.*	Geophyte	Ephemeral	M, IT
	309.	*Ornithogalum narbonense L.*	Geophyte	Ephemeral	M, IT
	310.	*O. trichophyllum Boiss. & Heldr.*	Geophyte	Ephemeral	IT, SA
	311.	*Urginea maritima (L.) Baker*	Geophyte	Ephemeral	M
Linaceae	*312.*	*Linum mucronatum Bertol.*	Chamaephyte	Perennating	IT
Malvaceae	*313.*	*Alcea acaulis (Cav.) Alef.*	Chamaephyte	Perennating	M
	314.	*A. setosa (Boiss.) Alef.*	Hemicryptophyte	Perennating	M
	315.	*A. striata (DC.) Alef.*	Hemicryptophyte	Perennating	IT
	316.	*Malva sylvestris L.*	Hemicryptophyte	Ephemeral	M, ES
	317.	*M. parviflora L.*	Therophyte	Ephemeral	M, IT
Moringaceae	*318.*	*Moringa peregrina (Forssk.) Fiori*	Tree	Perennating	SU
Papaveraceae	*319.*	*Glaucium arabicum Fresen.*	Hemicryptophyte	Perennating	IT
	320.	*G. aleppicum Boiss. & Hausskn.*	Hemicryptophyte	Perennating	IT
	321.	*G. grandiflorum Boiss. & A.Huet*	Hemicryptophyte	Perennating	IT
	322.	*Hypecoum procumbens L.*	Therophyte	Ephemeral	M
	323.	*Papaver argemone L.*	Therophyte	Ephemeral	M

	324.	*P. subpiriforme Fedde*	Therophyte	Ephemeral	M
	325.	*P. syriacum Boiss. & Blanche*	Therophyte	Ephemeral	M
	326.	*Roemeria hybrida (L.) DC.*	Therophyte	Ephemeral	M, IT
Pinaceae	*327.*	*Pinus brutia Ten.*	Tree	Perennating	E, P, EC
	328.	*P. halepensis Mill.*	Tree	Perennating	M
Plantaginaceae	*329.*	*Plantago lagopus L.*	Therophyte	Ephemeral	M
	330.	*P. crypsoides Boiss.*	Therophyte	Ephemeral	ES, M, IT
	331.	*P. ovata Forssk.*	Therophyte	Ephemeral	IT, SA
Polygonaceae	*332.*	*Emex spinosa (L.) Campd.*	Therophyte	Ephemeral	M
	333.	*Polygonum equisetiforme Sm.*	Hemicryptophyte	Perennating	M, IT
Primulaceae	*334.*	*Anagallis arvensis L.*	Therophyte	Ephemeral	ES, M, IT
Ranunculaceae	*335.*	*Adonis annua L.*	Therophyte	Ephemeral	M
	336.	*A. aestivalis L.*	Therophyte	Ephemeral	ES, M, IT
	337.	*A. dentata Delile*	Therophyte	Ephemeral	IT, SA
	338.	*A. microcarpa DC.*	Therophyte	Ephemeral	M
	339.	*Anemone coronaria L.*	Geophyte	Ephemeral	M
	340.	*Consolida hispanica (Costa) Greuter & Burdet*	Therophyte	Ephemeral	IT
	341.	*Delphinium peregrinum L.*	Therophyte	Ephemeral	M, IT
	342.	*Ranunculus asiaticus L.*	Geophyte	Ephemeral	M
Resedaceae	*343.*	*Reseda alba L.*	Therophyte	Ephemeral	M, IT
	344.	*R. lutea L.*	Therophyte	Ephemeral	ES, M, IT
Rosaceae	*345.*	*Sarcopoterium spinosum (L.) Spach*	Chamaephyte	Perennating	M
Rubiacea	*346.*	*Asperula arvensis L.*	Therophyte	Ephemeral	M, IT
	347.	*Crucianella macrostachya Boiss.*	Therophyte	Ephemeral	M
	348.	*Galium hierochuntinum Bornm.*	Therophyte	Ephemeral	SA
	349.	*G.judaicum Boiss.*	Therophyte	Ephemeral	M
	350.	*G. murale (L.) All.*	Therophyte	Ephemeral	M
	351.	*Valantia hispida L.*	Therophyte	Ephemeral	M
Scrophulariaceae	*352.*	*Kickxia aegyptiaca (L.) Nabelek*	Chamaephyte	Perennating	M, SA
	353.	*Scrophularia xanthoglossa Boiss.*	Chamaephyte	Perennating	M, IT
	354.	*Verbascum fruticulosum Post*	Chamaephyte	Perennating	IT
	355.	*V. sinaiticum Benth.*	Hemicryptophyte	Perennating	IT, SA
Solanaceae	*356.*	*Datura innoxia Mill.*	Therophyte	Ephemeral	PT
	357.	*Hyoscyamus aureus L.*	Chamaephyte	Perennating	M, IT
	358.	*H. reticulatus L.*	Biennial, Therophyte	Perennating	IT
	359.	*Nicotiana glauca Graham*	Tree	Perennating	PT
	360.	*Solanum nigrum L.*	Hemicryptophyte	Ephemeral	ES, M, IT
	361.	*S. villosum (L.) Mill.*	Hemicryptophyte	Ephemeral	ES, M, IT
Tamaricaceae	*362.*	*Reaumuria hirtella Jaub. & Spach*	Chamaephyte	Perennating	IT, SA
	363.	*Tamarix tetragyna Ehrenb.*	Tree	Perennating	M, SA
Umbelliferae	*364.*	*Apium graveolens L.*	Therophyte	Ephemeral	PT
	365.	*Astomaea seselifolium DC.*	Geophyte	Ephemeral	M, IT
	366.	*Chaetosciadium trichospermum (L.) Boiss.*	Therophyte	Ephemeral	M
	367.	*Conium maculatum L.*	Hemicryptophyte	Ephemeral	ES, M, IT
	368.	*Daucus carota L.*	Hemicryptophyte, Therophyte	Ephemeral	M
	369.	*D. durieua Lange*	Therophyte	Ephemeral	M, IT
	370.	*Eryngium creticum Lam.*	Hemicryptophyte	Perennating	M

	371.	*E. glomeratum Lam.*	Hemicryptophyte	Perennating	M
	372.	*Falcaria vulgaris Bernh.*	Hemicryptophyte	Perennating	ES, M, IT
	373.	*Ferula communis L.*	Hemicryptophyte	Perennating	M
	374.	*Foeniculum vulgare Mill.*	Hemicryptophyte	Perennating	M, IT
	375.	*Lagoecia cuminoides L.*	Therophyte	Ephemeral	M
	376.	*Malabaila secacul (Banks & Sol.) Boiss.*	Hemicryptophyte	Ephemeral	IT
	377.	*Peucedanum junceum (Boiss.) Mouterde*	Hemicryptophyte	Ephemeral	M
	378.	*Pimpinella corymbosa Boiss.*	Hemicryptophyte	Ephemeral	IT
	379.	*Ridolfia segetum (L.) Moris*	Therophyte	Ephemeral	M
	380.	*Tordylium aegyptiacum (L.) Lam.*	Therophyte	Ephemeral	M, IT
	381.	*T.trachycarpum (Boiss.) Al-Eisawi & Jury*	Therophyte	Ephemeral	M
Urticaceae	*382.*	*Parietaria alsinifolia Delile*	Therophyte	Ephemeral	SA
	383.	*P. judaica L.*	Hemicryptophyte	Perennating	M, IT
	384.	*Urtica pilulifera L.*	Therophyte	Ephemeral	ES, M, IT
Zygophyllaceae	*385.*	*Fagonia mollis Delile*	Chamaephyte	Perennating	SA
	386.	*Peganum harmala L.*	Hemicryptophyte	Perennating	IT, SA
	387.	*Zygophyllum dumosum Boiss.*	Chamaephyte	Perennating	SA

I. The chorotypes are: A, American; IT, Irano-Turanian; ES, Euro-Siberian; M, Mediterranean; SA, Saharo-Arabian; SU, Sudania; TR, Tropical; PT, Plurireginalbor-trop; OM, Oro Mediterranean; E, Exotic; P, Planted; EC, Escaped from cultivation.

II. Red color, Critically Endangered; Orange, Endangered; Yellow, Vulnerable and Green, Near-threatened.