

Endemic plant species in the west of Hebron, Palestine

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ABSTRACT

This research contains a study of part of the vegetation cover in the west of Hebron territories (Idna & Suba, Al-kum, Farsh Al-Hawa and Tarqumia village) in Palestine, including many different plant varieties. This area is of great local importance for plants with a good endemism rate of 8.84%. The aim of this study is to identify the endemic species and determine their life form and habitat. Over 200 random samples were also analysed for over 1,300 species of plants distributed in the study area, based on the Braun-Blanquet methodology for botanical analysis. During the process of studying and analysing the flora, 115 endemic plant species were recorded out of a total of 1,300 plant species and 30 family, and covering an area of about 71 Km². According to Raunkiaer's life form system of endemic plants, were the phanerophytes as a trees & shrubs (6%) dominated followed by *Rhamnus palaestinus* Boiss., *Pistacia palaestina* Boiss., *Quercus look* Kotschy and *Prunus ramonensis* (Danin) Eisenman; annuals or therophyte (41%) as *Erodium telavivense* Eig., *Galium philistaeum* Boiss., *Galium judaicum* Boiss., *Galium hierochuntinum* Bornm., *Galium pisiferum* Boiss., *Aegilops sharonensis* Eig., *Anthemis leucanthemifolia* Boiss., *Anthemis bornmuelleri* Stoj. & Acht., *Anthemis brachycarpa* Eig., *Anthemis cornucopiae* Boiss., *Anthemis edumaea* Eig., *Anthemis eliezrae* Eig.; geophytes (18%) as *Asparagus palaestinus* Baker, *Tulipa sharonensis* Dinsm; hemicryptophytes (16%) as *Salvia palaestina* Benth., *Onopordum carduiforme* Boiss. and *Rheum palaestinum* Feinbrun; and chamaetophyte & semi shrubs (13%) as *Phlomis brachyodon* (Boiss.) Zohary and *Phlomis platystegia* Post.; Compositae, Lamiaceae and Papilionaceae were among the wealthiest families in the current study, accounting for (15%), (13%) and (10%) of the taxa, respectively.

The region study is belong to the dry, arid and semi-arid of ombrotype, and thermo-inframediterranean thermotype.

Keywords: Palestine, Idna, Tarqumia, Al-Kum, Farsh Al-Hawa, Vegetation, Flora, Plants, Ecology.

INTRODUCTION

The Hebron region in the south of Palestine represents a model of biological and diversity, and this is due to its geographical location, fertility of its lands and its various topography, as it is affected by the climate of the Mediterranean region from the north, the African desert such as Sinai and the Negev in the south, the Dead Sea and the Jordan River in the east, and the Palestinian coast & the Mediterranean to the west. A few studies were done to the structure and flora of phanerophytes, and herbaceous layer in the botanical assemblages in the west Hebron area, in this study, the species were classified according to their the Raunkiaer's life forms system were used to describe the west Hebron flora. A region's flora constitutes an important cultural legacy, with its biodiversity, biological and ecological system, and many researchers and botanists throughout the world have studied flora, plant species [1, 2, 3, 4, 5, 6], and their associations, communities and phytosociological in Mediterranean basin [3, 4, 5, 6]. Palestine is part of the Mediterranean basin, and several botanists have studied the rare and native endemic flora of Palestine [1, 2, 3, 4, 5, 6], Mediterranean regions such as Cyprus [7, 8], and Africa as Egypt [9, 10, 11, 12].

Despite its small area, which does not exceed approximately 27,000 Km², Palestine enjoys a unique biodiversity, as it is located in the heart of the ancient world, between three continents - Europe, Africa and Asia, in addition to its climate, topography and soil type, and it is represents a vital model for many from different types of plants [4, 6, 12, 13, 14]. Numerous botanists and researchers have carried out research into its plants, climate and bioclimate [15-24], and the ecological framework of plants combined with the various ecological and agricultural systems in that region [24, 25]. Around 2,780 native plants, of which 162 are endemic species, 872 genera and 144 families have been recorded for Palestinian plants [4, 5, 6, 26, 27, 28, 29, 30, 31, 32, 33, 34]; a studies by Ighbareyeh et al. [4, 5, 6], Zohary [26], and Danin [34] found 2,780 species of plants, of which 162 are endemic rare, and 144 families of Palestinian plants.

Palestine is also one of the most beautiful and picturesque parts of the world, and is characterized by its diversity of vegetation, topography, geographic and climatic variation, variation in rainfall rates and distribution, soil diversity, the diverse geological composition of its land, and the differences in its natural topography, which varies between desert and mountainous areas reaching a height of more than 1,050 metres above sea level, to coastal areas extending to the Palestinian seaboard, and to valley areas and the Al-Aghwar district at under 400 metres below sea level; as a result, Palestine is a natural museum with abundant riches, including many floral and non-flowering wild plants [4, 6].

Hebron is an example of the biodiversity in Palestine, which is unique due to its topography, soils, climate, the presence of the Negev desert and Sinai in the far south and its high mountains characterized by the climate and flora of the Mediterranean region [3, 4, 5, 6, 10, 11].

The area studied in this paper is only part of the vital plant system of Palestine and the Mediterranean region. The purpose of this paper is to study the endemic plant species and determine their life form and habitat in the area of Idna & Suba, Al-Kum, Farsh Al-Hawa and Tarqumia to the west of the city of Hebron, Palestine.

MATERIALS AND METHODS

Study area

The study area included four interconnected areas, namely the village of Idna or Idhna & Suba Al-Kum, Farsh Al-Hawa and Tarqumia village area, and all of these areas are located near the apartheid wall, with the exception of Farsh Al-Hawa area, on which of Adora and Telem settlement was established since the seventies of the last century. However, the covered study area is located to the west of Hebron, to the east of the village of Beit Jibrin and Al-Dawayima, which were occupied in 1948 by Israel, and the town Beit Kahel to the north, while from the south, Dura & its residential communities and the village of Dhahiriya [7, 8, 9, 10]. The coordinates and elevation of study area where, Idna village ($31^{\circ}33'31''\text{N}$ $34^{\circ}58'34''\text{E}$, elevation 470 m), Suba town ($31^{\circ}54'\text{N}$ $34.99''\text{E}$, elevation 561m); Al-Kum village ($31^{\circ}53'\text{N}$ $34.96''\text{E}$, elevation 493 m); Farash Al-Hawa area ($31^{\circ}56'\text{N}$ $35.08''\text{E}$, elevation 883 m on sea level), and Tarqumia village (31.575°N 35.01306°E , elevation 460-550m); with an average area of more than 71 Km^2 (Figure 1).

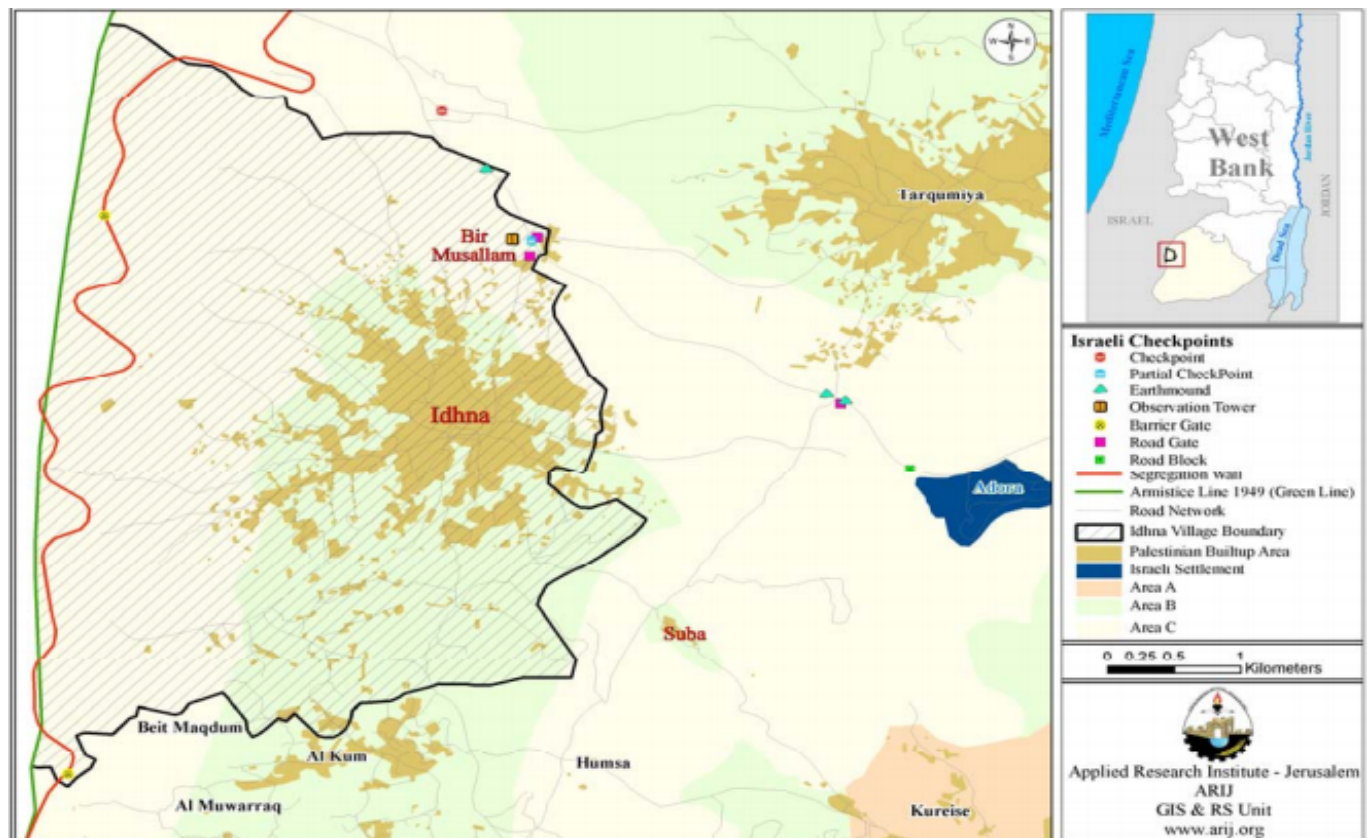


Fig. 1. A part of the study site is for the villages of Idna, Al-Kum and Suba.

Vegetation data collection

The samples were collected from November 2020 to Mayo 2021, and data were compiled from 200 different plant samples. Samples were taken from different areas in Idna or Idhna, Al-Kum, Suba, and Farsh Al-Hawa & Tarqumia, representing various herbs, shrubs, forest trees and others, to obtain the biological and environmental indicators and plants. These plants that originated in the study area, in the West Hebron region are part of the flora of Hebron mountains height land, the eastern Mediterranean and the occupied Palestinian coast, Dead Sea, and the Negev desert, Sinai, addition to Lebanon, Jordan, Syria and Mediterranean coast. The data were collected according to the methodology of Braun-Blanquet [35, 36], Molinier [37, 38], and Salvador Rivas-Martínez [39, 40].

RESULTS

Forest & maquis and Herbaceous plants vegetation

In this research, more than 1,300 new plant species belonging to trees, forests, shrubs, steppes and herbaceous species were analysed and identified (Figure 2), and we recorded 115 species belonging to 30 families (Table 1), in addition to medicinal plants. In forest & maquis and shrubs, our statistical analysis was dominated by pine and coniferous woodland species (no endemic) such as *Cupressus sempervirens* L., *Cupressus arizonica* L. and *Cupressus macrocarpa* L., *Pinus halepensis* Miller, *Pinus Pinea* L., *Pinus canariensis* C. Smith, *Pinus brutia* Tenore, *Juniperus phoenicea* L., *Juniperus excelsa* M. Bieb., and *Juniperus drupacea* Labill.; forests of *Acer* genus, pistachio genus and *Quercus* such as *Quercus libani* G. Olivier, *Quercus calliprinos* Webb., *Quercus look Kotschy*, *Pistacia lentiscus* L. and *Pistacia khinjuk* Stocks, *Ceratonia siliqua* L. and other species, while, the analysis identified the following endemic species: *Rhamnus palaestina* Boiss., *Pistacia palaestina* Boiss., *Acer obtusifolium* Sm., *Prunus ramonensis* (Danin) Eisenman, *Quercus look Kotsch*, *Tamarix palestina* Bertol., *Tamarix jordanis* Boiss., *Reaumuria negevensis* Zohary & Danin and *Tamarix negevensis* Zohary. These are forests growing in regions with a thermomediterranean-mesomediterranean thermotype and dry to sub-humid and humid environments in soil comprising carbon substrates such as Brown Ruinsenas and light Rendzinas (Terra Rossa), Limestone, Brown alluvial soils and a neutral pH., and as common in Mediterranean woodlands and shrub-lands and relict maquis trees [7, 8,9,10]. This territory has a gradient of 5-15%, with a plant cover rate of 70%, an average altitude of between 400– 900 m and a vegetation height of 7–10 m (Table 1). Whereas for herbaceous plants, its growing in various in climatophilic and steppe environments in dry-subhumid areas with an infra-thermomediterranean to mesomediterranean thermotype, developing on limestone hills in mountain ranges in the Mediterranean region and Palestine [8]. These plants are adapted to altitudes of 400–900 metres on sea level, with a slope of 5-15%, an average altitude of 0-1.5 m, with Terra Rossa, Rendzina, Limestone, Brown alluvial soils and a neutral pH. The following species are endemic: *Aegilops sharonensis* Eig., *Trisetaria koelerioides* (Bornm. & Hack.) Melderis, *Arrhenatherum palaestinum* Boiss., *Desmazeria philistaea* (Boiss.) H. Scholz, *Allium papillare* Boiss., *Allium telavivense* Eig., *Allium qasyunense* Mouterde, *Anacamptis israelitica* (H. Baumann & Dafni), *Orobanche palaestina* Reut., *Orchis galilaea* (Bornm. et Schulze) Schltr., *Anthemis leucanthemifolia* Boiss., *Anthemis bornmuelleri* Stoj. & Acht., *Anthemis brachycarpa* Eig., *Anthemis cornucopiae* Boiss., *Anthemis edumea* Eig., *Anthemis eliezrae* Eig., *Anthemis maris-mortui* Eig., *Anthemis nabataea* Eig., *Anthemis palestina* Boiss., *Anthemis tenuicarpa* Eig., *Onopordum palaestinum* Eig., *Anthemis hebronica* Boiss. & Kotschy., *Crepis aculeata* (DC.) Boiss., *Echinops philistaeus* Feinbrun & M. Zohary, *Onopordum carduiforme* Boiss., *Senecio joppensis* Dinsmore, *Calendula palaestina*

Boiss., *Ballota philistaea* Bornm., *Origanum syriacum* L., *Micromeria fruticosa* (L.) Druce., *Micromeria danaensis* Danin, *Micromeria sinaica* Benth., *Salvia palaestina* Benth., *Phlomis chrysophylla* Boiss., *Phlomis brachyodon* (Boiss.) Zohary, *Stachys palaestina* L., *Stachys zoharyana* Eig., *Phlomis platystegia* Post., *Salvia eigii* Zohary, *Salvia hierosolymitana* Boiss., *Satureja thymbrifolia* Hedge & Feinbrun, *Kickxia judaica* Danin, *Polygonum palaestinum* Zohary, *Rumex occultans* Sam., *Rheum palaestinum* Feinbrun, *Tordylium palaestinum* Zohary, *Ferula daninii* Zohary, *Paronychia palaestina* Eig., *Silene palaestina* Boiss., *Tulipa sharonensis* Dinsm., *Asparagus palaestinus* Baker, *Erodium subintegrifolium* Eig., *Erodium telavivense* Eig., *Galium philistaeum* Boiss., *Galium judaicum* Boiss., *Galium hierochuntinum* Bornm., *Galium pisiferum* Boiss., *Iris vartanii* Foster, *Iris palaestina* (Baker) Boiss., *Maresia pulchella* (DC.) O. E. Schulz, *Iris atropurpurea* Dinsmore, *Ornithogalum fuscescens* Boiss. & Gaill., *Ornithogalum narbonense* L., *Bellevia eigii* Feinbrun, *Linaria joppensis* Bornm., *Verbascum berytheum* Boiss., *Scrophularia hierochuntina* Boiss., *Scrophularia nabataeorum* Eig., *Verbascum caesareum* Boiss., *Verbascum eremobium* Murb., *Verbascum gaillardotii* Boiss., *Verbascum jordanicum* Murb., *Verbascum qulebicum* Post., *Lathyrus lentiformis* Plitmann, *Lathyrus plitmannii* Greuter & Burdet., *Trifolium berytheum* Boiss. & Blanche, *Trifolium billardiieri* Spreng., *Trifolium dichroanthum* Boiss., *Trifolium salmoneum* Mouterde, *Trifolium dichroanthum* Boiss., *Trifolium palaestinum* Boiss., *Trifolium philistaeum* Zohary, *Astragalus palaestinus* Eig., *Lotus palaestinus* (Boiss. & Blanche) Blatt., *Suaeda palaestina* Eig. & Zohary, *Haloxylon negevensis* (Iljin & Zohary) L. Boulos, *Salsola jordanicola* Eig., *Convolvulus jordanensis* Sa'ad, *Convolvulus palaestinus* Boiss., *Cuscuta palaestina* Boiss., *Quidproquo confusum* Greuter & Burdet, *Prunus ramonensis* (Danin) Eisenman, *Symphytum palaestinum* Boiss., *Echium judaeum* Lacaita, *Cerinthe palaestina* Eig. & Sam., *Heliotropium maris-mortui* Zohary, *Nonea philistaea* Boiss., *Alkanna galilaea* Boiss., *Alkanna strigosa* Boiss. et Hohen, *Anchusa negevensis* Danin, *Tamarix gennessarensis* Zohary, *Reaumuria negevensis* Zohary & Danin, *Tamarix jordanis* Boiss., *Tamarix palestina* Bertol., *Arum palaestinum* Boiss., *Biarum angustatum* (Hook.f.) N.E.Br., *Biarum olivieri* Blume, *Quercus look* Kotschy, *Acer obtusifolium* Sm., *Rhamnus palaestinus* Boiss., *Pistacia palaestina* Boiss., *Cyclamen persicum* Miller, *Androcymbium palaestinum* Baker, *Adonis palaestina* Boiss., *Micromeria serbaliana* Danin & Hedge as shown in (Table 1).



Fig. 2. *Anthemis palestina* Boiss. in Wadi Al-Shomer and Al-Mrabayeh, at the west of Idna village.

Table 1. Distribution and Synthetic representation of endemic plants in the study area.

Synthetic representation of plants	Idna & su ba	Tarqu mia	Al-Ku m	Farsh al-Hawa			
Elevation in m	50		45	85			
1 = 10	0	550	0	0			
	10	100	70	75			
Surface in (m2)	0						
Cover rate %	45	55	50	70			
Average height of vegetation in m	1.5	1	1	1.2			
Slope %	5	10	15	7			
Orientation	W	W	S	E			
Species					Life form	Habitat	Family
<i>Aegilops sharonensis</i> Eig.	VL			L	Therophyte	Sandy area	Poaceae
<i>Trisetaria koelerioides</i> (B orn. & Hack.) Melderis	VL	VL		L	Therophyte	Mediterranean	Poaceae

<i>Arrhenatherum palaestinum</i> Boiss.	VL	VL		L	Geophyte	Mediterranean, Batha, Phrygana	Poaceae
<i>Desmazeria philistaea</i> (Boiss.) H.Scholz	L	VL	VL	M	Therophyte	Mediterranean, Batha, Phrygana	Poaceae
<i>Allium papillare</i> Boiss.	M		M	L	Geophyte	Sandy area	Amaryllida ceae
<i>Allium telavivense</i> Eig.	VL			VL	Geophyte	Sandy area	Amaryllida ceae
<i>Allium qasyunense</i> Mouterde	VL		L		Therophyte	Sandy area	Amaryllida ceae
<i>Anacamptis israelitica</i> (H. Baumann & Dafni)	L		L	L	Geophyte	Sandy area	Orchidacea e
<i>Orobanche palaestina</i> Reut.	VL		VL	VL	Geophyte Parasite	Mediterranean, Batha, Phrygana	Orchidacea e
<i>Orchis galilaea</i> (Bornm. et Schulze) Schltr.				VL	Geophyte Parasite	Maquis, Mediterranean, Batha, Phrygana	Orchidacea e
<i>Anthemis leucanthemifoli a</i> Boiss.	VH	M	M	M	Therophyte	Mediterranean, Batha, Phrygana	Compositae
<i>Anthemis bornmuelleri</i> St oj. & Acht.	VH	M	L	H	Therophyte	Mediterranean maquis and forest, Batha, Phrygana	Compositae
<i>Anthemis brachycarpa</i> Ei g.	VH	M		M	Therophyte	Mediterranean maquis and forest, Batha, Phrygana	Compositae
<i>Anthemis cornucopiae</i> Bo iss.	VH	M	M	M	Therophyte	Mediterranean maquis and forest, Batha, Phrygana	Compositae
<i>Anthemis edumea</i> Eig.	VH	M	M	M	Therophyte	Mediterranean maquis and forest, Batha, Phrygana	Compositae
<i>Anthemis eliezrae</i> Eig.	VH	M		M	Therophyte	Sand desert	Compositae
<i>Anthemis maris- mortui</i> Eig.	VH	M	M	M	Therophyte	Sand desert	Compositae
<i>Anthemis nabataea</i> Eig.	M	M	M	M	Therophyte	Sand desert	Compositae
<i>Anthemis palestina</i> Boiss.	VH	M	M	M	Therophyte	Batha, Phrygana	Compositae
<i>Anthemis tenuicarpa</i> Eig.	M	L	M	M	Therophyte	Batha, Phrygana	Compositae

<i>Onopordum palaestinum</i> Eig.	H	M	M	H	Hemicryptophyte	Batha, Phrygana	Compositae
<i>Anthemis hebronica</i> Boiss. & Kotschy.	VH	L	M	VH	Therophyte	Mediterranean, Batha, Phrygana, and Desert	Compositae
<i>Crepis aculeata</i> (DC.) Boiss.	M			M	Therophyte	Mediterranean, Batha, Phrygana	Compositae
<i>Echinops philistaeus</i> Feinbrun & M.Zohary	H		M	M	Shrub	Mediterranean, Batha, Phrygana	Compositae
<i>Onopordum carduiforme</i> Boiss.	H		L	M	Hemicryptophyte	Sandy-loamy and sandy-silty on sandstone or alluvium	Compositae
<i>Senecio joppensis</i> Dinsmore	M	M	M	M	Therophyte	Sand	Compositae
<i>Calendula palaestina</i> Boiss.	H		M	H	Therophyte	Mediterranean maquis and forest, Batha, Phrygana	Compositae
<i>Ballota philistaea</i> Bornm.	M	M	M	M	Chamaephyte shrublet	Mediterranean maquis and forest, Batha, Phrygana	Lamiaceae
<i>Origanum syriacum</i> L.	L	VL	VL	L	Chamaephyte	Mediterranean maquis and forest, Batha, Phrygana	Lamiaceae
<i>Micromeria fruticosa</i> (L.) Druce.				VL	Chamaephyte	Hard rock outcrops	Lamiaceae
<i>Micromeria danaensis</i> Danin	M	M	M	M	Chamaephyte	Hard rock outcrops	Lamiaceae
<i>Micromeria sinaica</i> Benth.	M	L	M	M	Chamaephyte	Sand desert	Lamiaceae
<i>Salvia palaestina</i> Benth.	L	L	L	L	Hemicryptophyte	Mediterranean and sandy soil	Lamiaceae
<i>Phlomis chrysophylla</i> Boiss.	M		M	M	Chamaephyte	Mediterranean	Lamiaceae
<i>Phlomis brachyodon</i> (Boiss.) Zohary	L			M	Chamaephyte	Mediterranean	Lamiaceae
<i>Stachys palaestina</i> L.	M		M		Chamaephyte	Hard rock outcrops, Batha, Phrygana	Lamiaceae
<i>Stachys zoharyana</i> Eig.	M		M	M	Chamaephyte	Batha, Phrygana	Lamiaceae

<i>Phlomis platystegia</i> Post.	M	M	M	L	Chamaephyte semi-shrub	Batha, Phrygana	Lamiaceae
<i>Salvia eigii</i> Zohary	M	L	VL	L	Hemicryptophyte	Mediterranean, Batha, Phrygana	Lamiaceae
<i>Salvia hierosolymitana</i> Boiss.	H	L	M	M	Hemicryptophyte	Mediterranean, Batha, Phrygana	Lamiaceae
<i>Satureja thymbriifolia</i> Hedge & Feinbrun	H	L	M	L	Hemicryptophyte	Mediterranean, Batha, Phrygana	Lamiaceae
<i>Kickxia judaica</i> Danin	M		M	M	Chamaephyte shrublet	Transition and sandy area	Plantaginaceae
<i>Polygonum palaestinum</i> Zohary	M		M		Chamaephyte	Sands	Polygonaceae
<i>Rumex occultans</i> Sam.	M	M	M	M	Annual	Sandy soils of the coastal plain and the Negev	Polygonaceae
<i>Rheum palaestinum</i> Feinbrun	M	M	M	M	Hemicryptophyte	Desert	Polygonaceae
<i>Tordylium palaestinum</i> Zohary	M	L	L	M	Therophyte	Mediterranean, Batha, Phrygana	Apiaceae
<i>Ferula daninii</i> Zohary	L	M	M	M	Hemicryptophyte	Mediterranean, Batha, Phrygana	Apiaceae
<i>Paronychia palaestina</i> Eig.	M		M	L	Hemicryptophyte	Mediterranean, Batha, Phrygana	Caryophyllaceae
<i>Silene palaestina</i> Boiss.	M	L	L	L	Therophyte	Batha, Phrygana, Sand	Caryophyllaceae
<i>Tulipa sharonensis</i> Dinsm.	H	M	H	M	Geophyte	Mediterranean, Batha, Phrygana	Liliaceae
<i>Asparagus palaestinus</i> Baker	H	L	L	M	Geophyte Vine	Humid habitats	Liliaceae
<i>Erodium subintegrifolium</i> Eig.	L			M	Therophyte	Mediterranean Woodlands and Shrubland Sands and Mediterranean Woodlands and Shrubland	Geraniaceae
<i>Erodium telavivense</i> Eig.	L			L	Therophyte	Mediterranean Woodlands and Shrubland Sand, Mediterranean Woodlands and Shrublands, Shrub-steppes	Geraniaceae
<i>Galium philistaicum</i> Boiss.	M	M	M	M	Annual		Rubiaceae

<i>Galium judaicum</i> Boiss.	L		M	M	Annual	Mediterranean, Batha, Phrygana	Rubiaceae
<i>Galium hierochuntinum</i> Bornm.	L			M	Annual	Desert and transition	Rubiaceae
<i>Galium pisiferum</i> Boiss.	L			M	Annual	Batha, Phrygana	Rubiaceae
<i>Iris vartanii</i> Foster				VL	Geophyte	Mediterranean maquis and forest	Iridaceae
<i>Iris palaestina</i> (Bak.) Boiss	VL			VL	Geophyte	Batha, Phrygana, Mediterranean, sandstone ridges of the coastal plain	Iridaceae
<i>Maresia pulchella</i> (DC.) O.E.Schulz	M	M	M	M	Annual	Sandy and desert	Cruciferae
<i>Iris atropurpurea</i> Dinsmore				VL	Geophyte	Sand and Mediterranean Woodlands and Shrublands	Iridaceae
<i>Ornithogalum fuscenscens</i> Boiss. & Gaill.	M		M	M	Geophyte	Mediterranean Woodlands and Shrublands, Shrub-steppes	Asparagaceae
<i>Ornithogalum narbonense</i> L.	M	M	M	M	Geophyte	Batha, Phrygana, Mediterranean, sandstone ridges of the coastal plain	Asparagaceae
<i>Bellevalia eigii</i> Feinbrun	L			L	Geophyte	Batha, Phrygana, Shrub-steppes	Asparagaceae
<i>Linaria joppensis</i> Bornm.	L		M	M	Annual	Sands, Batha,	Scrophulariaceae
<i>Verbascum berytheum</i> Boiss.	M	M	M	M	Hemicryptophyte	Mediterranean, Loam soil in the coastal plain	Scrophulariaceae
<i>Scrophularia hierochuntina</i> Boiss.	L		L		Hemicryptophyte	Batha & Garigue	Scrophulariaceae
<i>Scrophularia nabataeorum</i> Eig.	L	L	L	L	Hemicryptophyte	Mediterranean	Scrophulariaceae
<i>Verbascum caesareum</i> Boiss.	H	M	M	M	Hemicryptophyte	Mediterranean	Scrophulariaceae
<i>Verbascum eremobium</i> Muirb.	M	M	M	M	Chamaephyte Shrubs	Mediterranean	Scrophulariaceae

<i>Verbascum gaillardotii</i> Boiss.	M	M	M	M	Hemicryptophyte	Mediterranean	Scrophulariaceae
<i>Verbascum jordanicum</i> Murb.	M	M	M		Hemicryptophyte	Mediterranean	Scrophulariaceae
<i>Verbascum qualebicum</i> Post.	M	M	H	H	Hemicryptophyte	Mediterranean	Scrophulariaceae
<i>Lathyrus lentiformis</i> Plitmann	VH	H	H	H	Therophyte	Mediterranean maquis and forest	Papilionaceae
<i>Lathyrus plitmannii</i> Greuter & Burdet.	VH	H	H	H	Therophyte	Mediterranean maquis and forest	Papilionaceae
<i>Trifolium berytheum</i> Boiss. & Blanche	VH	H	H	H	Therophyte	Mediterranean maquis and forest	Papilionaceae
<i>Trifolium billardierei</i> Spreng.	VH	H	H	H	Therophyte	Mediterranean maquis and forest	Papilionaceae
<i>Trifolium dichroanthum</i> Boiss.	VH	H	H	H	Therophyte	Sandy and Mediterranean maquis and forest	Papilionaceae
<i>Trifolium salmoneum</i> Mouterde	VH	H	H	H	Therophyte	Mediterranean maquis and forest	Papilionaceae
<i>Trifolium dichroanthum</i> Boiss.	VH	H	H	H	Therophyte	Mediterranean maquis and forest	Papilionaceae
<i>Trifolium palaestinum</i> Boiss.	VH	H	H	H	Therophyte	Mediterranean maquis and forest	Papilionaceae
<i>Trifolium philistaeum</i> Zohary	VH	H	H	H	Therophyte	Mediterranean maquis and forest	Papilionaceae
<i>Astragalus palaestinus</i> Eig.	M	M	M	M	Hemicryptophyte	Sand, Mediterranean	Papilionaceae
<i>Lotus palaestinus</i> (Boiss. & Blanche) Blatt.	VH	H	VH	H	Annual	Mediterranean maquis and forest	Papilionaceae
<i>Suaeda palaestina</i> Eig. & Zohary	M	M	M	M	Shrubs	Sandy desert	Amaranthaceae
<i>Haloxylon negevensis</i> (Iljin & Zohary) L.Boulos	L		VL		Shrubs	Desert and transtion	Amaranthaceae

<i>Salsola jordanicola</i> Eig.	M	L	L	L	Annual	Desert and transtion	Amarantha ceae
<i>Convolvulus jordanensis</i> Sa'ad	L		L		Therophyte	Mediterranean maquis and forest	Convolvula ceae
<i>Convolvulus palaestinus</i> Boiss.	L	L	L	M	Geophyte, vine	Mediterranean, Batha, Phrygana	Convolvula ceae
<i>Cuscuta palaestina</i> Boiss.	L	VL	L	L	Annual, Parasite, Vine	Mediterranean, Batha, Phrygana	Convolvula ceae
<i>Quidproquo confusum</i> Greuter & Burdet	VH	M	H	M	Annual	Batha, Phrygana	Cruciferae
<i>Prunus ramonensis</i> (Danin) Eisenman	M	L	VH	L	Tree	Mediterranean maquis and forest	Rosaceae
<i>Symphytum palaestinum</i> Boiss.	M	M	M	M	Hemicrypto phyte	Mediterranean Woodlands and Shrublands, Semi-steppe	Boraginace ae
<i>Echium judaeum</i> Lacaita	M	M	M	M	Therophyte	Mediterranean maquis and forest	Boraginace ae
<i>Cerinthe palaestina</i> Eig. & Sam.	M	L	L	M	Therophyte	Mediterranean Woodlands and Shrublands, Semi-steppe	Boraginace ae
<i>Heliotropium maris-mortui</i> Zohary	L		L	L	Shrubs	Sandy desert	Boraginace ae
<i>Nonea philistaea</i> Boiss.	L	L	L	M	Therophyte	Batha, Phrygana	Boraginace ae
<i>Alkanna galilaea</i> Boiss.	M	L	M	M	Hemicrypto phyte	Mediterranean Batha, Phrygana	Boraginace ae
<i>Alkanna strigosa</i> Boiss. et Hohen	M	L	M	L	Chamaephy te	Mediterranean Batha, Phrygana	Boraginace ae
<i>Anchusa negevensis</i> Danin	L	L	L		Annual	Sand desert, transition	Boraginace ae
<i>Tamarix gennessarensis</i> Zohary			VL		Tree	Thermophilous plants	Tamaricace ae
<i>Reaumuria negevensis</i> Zohary & Danin	L	L	L	L	Shrub	Sand desert/Thermophilou s plants	Tamaricace ae
<i>Tamarix jordanis</i> Boiss.	VL		VL	VL	Tree	Humid habitats	Tamaricace ae

<i>Tamarix palestina Bertol</i>	VL		VL	VL	Tree	Sand desert & transition, Thermophilous plants	Tamaricaceae
<i>Arum palaestinum Boiss.</i>	M	M	M	M	Geophyte	Batha, Phrygana	<u>Araceae</u>
<i>Biarum angustatum (Hook.f.) N.E.Br.</i>	M		L	M	Geophyte	Batha, Phrygana	<u>Araceae</u>
<i>Biarum olivieri Blume</i>	L		L	M	Geophyte	Batha, Phrygana	<u>Araceae</u>
<i>Quercus look Kotschy</i>	VL			VL	Phanerophyte tree	Mediterranean maquis and forest	Fagaceae
<i>Acer obtusifolium Sm.</i>	VL	VL		VL	Tree	Mediterranean maquis and forest	Aceraceae
<i>Rhamnus palaestinus Boiss.</i>	VH	H	VH	VH	Phanerophyte shrub	Mediterranean maquis and forest	Rhamnaceae
<i>Pistacia palaestina Boiss.</i>	M	M	L	H	Phanerophyte tree	Mediterranean maquis and forest	Anacardiaceae
<i>Cyclamen persicum Miller</i>	H	M	H	H	Geophyte	Mediterranean maquis and forest, Batha, Phrygana	Primulaceae
<i>Androcymbium palaestinum Baker</i>	M	M	M	M	Geophyte	Sand and Desert	Colchicaceae
<i>Adonis palaestina Boiss.</i>	M		M	L	Annual	Batha, Phrygana	Ranunculaceae
<i>Micromeria serbaliana Danin & Hedge</i>	VL				Chamaephyte	Mediterranean	Lamiaceae

The abbreviations in the table represent, the plant species presence endemic in the study area, where: VH: Very high, H: high, M: Medium, L: Low, VL: Very low; while the empty place indicates that no any plant species was recorded for the study area.

DISCUSSION

The study area is rich in the types of plants that inhabit Palestine, and therefore it is located within a vital area in general, as it is affected by the climate of the western mountainous highlands of the Hebron Governorate, the west of the Dead Sea, the eastern areas of the Palestinian coast, the northern Negev desert and Sinai, in addition to the Red Sea, while from the north the heights of the West Bank Western until the borders of Lebanon and Syria. However, the plant of this region is considered part of the flora of Palestine, and the eastern Mediterranean, western Asia, western Dead Sea, northern Red Sea and African Sahara, which botanists have divided into eight distinct groups: the Mediterranean and the European - Siberian, Eurasian, Iranian-Turanian, Sudanese Zambese, Sahara-Arab, the Americas, Australia,

South Africa and other plants that grow in the area of Palestine and on the coast of the Levant [1, 2, 3, 4, 5, 6, 26, 27, 30, 31, 32, 33].

Studies on herbaceous plants, the life forms and habitat of the plant species in the West Hebron area are rare, and this study shows the importance of herbaceous, shrubs and forests plants in this area, and the Compositae or (Asteraceae), Lamiaceae or (Labiatae) and Papilionaceae or (Fabaceae, Leguminosae) species were among the richest families in the current study and were represented mainly by herbal species (chamaephytes, hemicryptophytes and therophyte).

The Compositae family represented about 17 species (15%), Lamiaceae 15 (13%), Papilionaceae 11 (10%) and Scrophulariaceae 9 (8%) of the rest families, as in (figure 3).

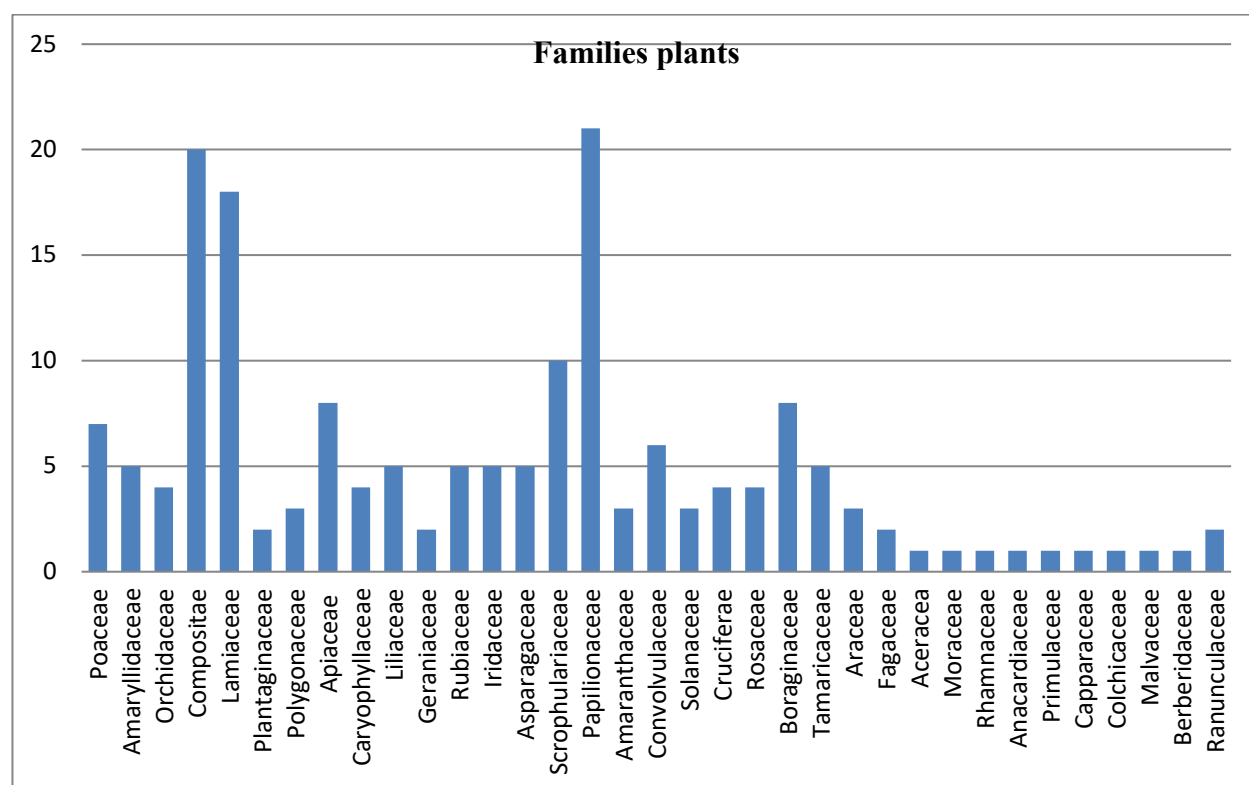


Fig. 3. The families of plants studied in the study area.

Nevertheless, the most represented categories in the floristic spectrum were endemic plants such as trees, shrublets (phanerophytes), chamaephytes, hemicryptophytes and therophyte, 115 endemic plant species, of which 36 are endemic rare species, which the phanerophytes as (Tree & shrubs) 8 (6%), shrubs 5 (4%), therophytes or annuals 47 (41%), annual parasite vine 1 (1%), geophytes 20 (18%), and hemicryptophytes 19 (16%), and chamaetophyte, semi shrubs 15 (13%) of the species, and according to Raunkiaer's plant life form system, as shown in (Table 1 and (Figure 4).

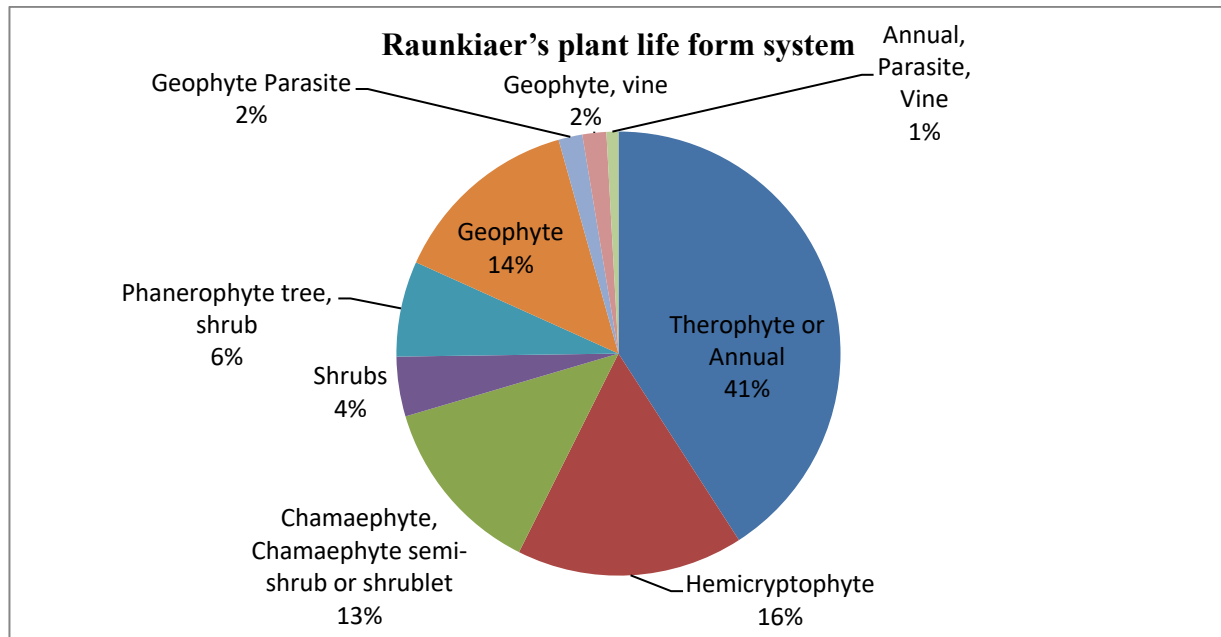


Fig. 4. Raunkiaer's plant life form system.

Moreover, in general, there are some endemic plants in Palestine facing the phenomenon of extinction, especially plants of the Iridaceae family such as, *Iris vartanii* Foster, *Iris atrofusca* Baker., *Iris atropurpurea* Dinsmore, and *Iris lortetii* Barbey ex Boiss., where Nablus area is considered the original home of some of these varieties, in addition to that some endemic varieties were not represented in an acceptable manner in this study, but these varieties are abundant in other areas of Palestine, especially the northern region, such as Nablus, Jenin, Tulkarem, Galilee, Safad, Acre, Nazareth, Haifa and Ras Al-Naqoura. However, Through our study of this research, there are endemic plant varieties with a high degree of scoring, while there are few varieties to be targeted or exist, therefore we must work to preserve the endemic varieties in Palestine by enacting laws that prohibit cutting plants and eliminating vegetation cover, despite of, these laws exist, but they need to be strictly applied to curb wrong human activities against the environment and plants, establishing a seed bank to protect plants from extinction, and replanting these seeds according to reproduction method for each plant, especially in the nature reserves supervised by the state to ensure that they are not eliminated, despite the special Palestinian case, in which the Palestinians do not control anything, taking into account the environmental and climatic factors of plants, in addition to the use of various media, and continuo to work scientific congresses, seminars that concerned with preserving plants as an important natural wealth for Palestine.

In recent years, especially in the areas around the study area in Hebron such as the village of Idna, we have identified eight new botanical associations [3,4,5,6]:

*Pistacio palaestinae-Quercetum lokii**

Capparido sinaicae-Ceratonietum siliquae

*Cerasus microcarpae-Quercetum ithaburensis**

*Pyro siriaca-Abietetum cilicicae**

Abio cilicicae-Ceratonietum siliquae

Periploco aphylli-Pinetum halepensis

Cytisopsis pseudocytiso-Tamaricetum tetragynae

Crataego sinaicae-Tamaricetum jordanii

And the last study recent in forest Wadi Al-Quf by Ighbareyeh et al., 2021 [41], it has been studied three associations as *Pistacio lentisci-Quercetum lokii* Ighbareyeh M. H. J, A. A. Suliemieh, A. Cano-Ortiz & E. Cano nova. hoc loco., *Cerantonio siliquae-Quercetum callipinii* ass. nova. and *Pino halepensis-Curessetum sempervirentis* ass. nova., with three alliance as *Pistachio- Quercion lokii*, *Cerantonion siliquae -Quercion calliprinae* and *Pino halepensis-Cupression sempervirentis*.

* Associations in which olive cultivation is possible.

CONCLUSION

The study represented a vital and acceptable area of endemic plants in Palestine, especially the western region of the Hebron governorate, that we recorded about 115 endemic plant ,which of 36 (31.30%) are endemic rare species, with more than 1,300 plant varieties, where herbaceous plants covered most of the endemic plants, including the family Compositae (15%), Lamiaceae (13%), Papilionaceae (10%), and Scrophulariaceae (8%) of the 30 families. The study area belong to the inframediterranean & thermomediterranean thermotype, and a subhumid, dry, arid and semi-arid ombrotype.

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