

The State of Floristic Composition of Derna Region (Libya) before Danial Hurricane

Farag M. El-Mokasabi¹, Hamad M. Adress², Khadijah. F. Al-Awjali³, Naser Omar^{4*}

¹Horticulture Department, Faculty of Agriculture, University of Benghazi, Libya.

²Chemistry Department, Faculty of Science, Omar Al-Mukhtar University, Libya.

³Botany Department, Faculty of Science, Omer Al-Mukhtar University, Derna branch, Libya.

⁴Department of Botany, Faculty of Arts and Sciences, University of Benghazi, El-Abyar, Libya.

*Email (for reference researcher): naser.omar@uob.edu.ly

حالة التركيبة النباتية لمنطقة درنة (ليبيا) قبل إعصار دانيال

فرج المقصبي¹، حمد ادريس²، خديجة الأوجلي³، ناصر عمر⁴

¹ قسم البستنة، كلية الزراعة، جامعة بنغازي، ليبيا

² قسم الكيمياء، كلية العلوم، جامعة عمر المختار، ليبيا.

³ قسم علم النبات، كلية العلوم، جامعة عمر المختار – فرع درنة، ليبيا

⁴ * قسم علم النبات، كلية الآداب والعلوم، جامعة بنغازي – فرع الأبيار، ليبيا.

Received: 15-07-2025; Accepted: 10-09-2025; Published: 07-10-2025

الملخص

هدفت هذه الدراسة إلى تقييم الوضع الحالي للغطاء النباتي والتنوع البيولوجي في منطقة درنة بالجبل الأخضر. بدأ جمع النباتات منذ يوليو 2021، وعلى مدار العام خلال الفصول الأربعة. في هذا المسح، تم جمع وتحديد ما مجموعه 219 نوعاً من النباتات التي تنتمي إلى 192 جنساً و 72 عائلة. أظهرت النتائج هيمنة الفصيلة المركبة التي تمثل 23 نوعاً، تليها الفصيلة الشفوية بـ 21 نوعاً. ومن بين العدد الإجمالي، وُجد أن 176 نوعاً منها ينمو برياً و 43 نوعاً مزروعاً. وأظهر تحليل الشكل الحياتي هيمنة النباتات الحولية بنسبة 47% من النباتات العشبية يليها الأشجار والشجيرات بنسبة 21% وتحديد مجموعة من الأنواع المتوطنة في ليبيا وهي *Arbutus pavarii* pamp, *Arum cyrenaicum* Hruby, *Bellis sylvestris* Cyr, *Cyclamen rohlfsianum* Aschers, *Capparis spinose* L, *Cynara cyrenaica* Maire & Weiller, *Cupressus sempervirens* L. var. *horizontalis* (Mill) Gordon, *Onopordum cyrenaicum* Maire & Weiller, *Pallenis Cyrenaica* Alavi, *Teucrium davaeanum* Coss.

الكلمات المفتاحية: الغطاء النباتي، الأنواع المتوطنة، أشكال الحياة، درنة.

Abstract:

This study aimed to assess the current status of vegetation cover and biological diversity in the Derna region of Al-Jabal Al-Akhdar. The collection of plants started since July 2021, and over the course of the year during the four seasons. In this survey a total of 219 plant species were collected and identified belonging to 192 genera and 72 families. The results showed the dominance of the family Asteraceae, represented 23 species, and followed by the Lamiaceae with 21 species. Of the total number, 176 species were found to be growing wild and 43 cultivated. The life form analysis showed the dominance of annual plants with a percentage of 47% grass plants showed that the plant trees followed by trees and shrubs with a percentage of 21% and the identification a set of the endemic species in Libya, the *Arbutus pavarii* pamp, *Arum cyrenaicum* Hruby, *Bellis sylvestris* Cyr, *Cyclamen rohlfsianum* Aschers, *Capparis spinose* L, *Cynara cyrenaica* Maire & Weiller, *Cupressus sempervirens* L. var. *horizontalis* (Mill) Gordon, *Onopordum cyrenaicum* Maire & Weiller, *Pallenis Cyrenaica* Alavi, *Teucrium davaeanum* Coss..

Keywords: Vegetation, endemic species, life forms, Derna.

1. INTRODUCTION

Libya is a country located in the Maghreb region of North Africa. It covers an area of 1,760,000 square kilometers, mostly consisting of desert (over 90%) and a Mediterranean coastline. The country also has a green mountain region known as El-Jabal El-khdar, which contributes to approximately 50% of the total plant life in the country (Boulos, 1972). The remaining plants are found in other regions such as Al-Jabal Al-Garbi (Gharian), Ghadames, Fezzan, and Tripolitania.

The vegetation cover is a valuable natural resource in every country, and Libya is no exception. There is a growing interest in studying, inventorying, defining, classifying, and preserving plants in herbaria to protect them from the threat of extinction and disappearance (El Mokasabi, 2010).

Al- Jabal Al- Akhdar is an upland region located south of the coastal belt in the north-eastern of Libya in Cyrenaica. It extends along the coast to about 300 km and rises to some 881 m above sea level, cut by several wadis and receiving some 250 - 600 mm of precipitation annually, with red soil or heavy clay, (Al- Zwam, 1995). Wadi Derna is one of the most important wadis (Valleys) in Al-Jabal Al-Akhdar. Wadi Derna is a lush oasis in the Al-Jabal Al-Akhdar region of Libya, boasting a perennial water course that flows year-round (Trih, 1971).

Boulos, (1975) mentioned that Al-Jabal Al-Akhdar is considered the richest area of vegetation with the highest number of species (about 50% of the total plant species of the Libyan flora are confined to this region). Recently, there has been an imminent danger of genetic erosion of the plants especially the medicinal species in Al-Jabal Al-Akhdar because of heavy grazing, collection of medicinal and woody plants for local use and trading, over cultivation, recurrent drought conditions and hazards (El-Darier and El-Mogaspi, 2009). Conducting floristic investigations and classifying plant life forms can provide valuable information on the nomenclature, distribution, ecology, and utility of various plant species. Furthermore, these studies can contribute to the sustainable management and conservation of plant resources (Khakurel et al., 2020).

The history of plant exploration in Al-Jabal Al-Akhdar dates back to 1703, when Lamaire made some observations about *Sylphium* which he called selfione. *Sylphium* was one of the most important extinct plant species in Cyrenaica. At the beginning of the nineteenth century, Durand & Barratte (1910) published *Florae Libycae Prodromus*. It was the first attempt to write about the flora of the whole country, and included 1026 species and 20 plates. Vaccari (1914) As well-made extensive collections from Benghazi, Tulmitha, Susa, Derna and Tobruk, and reported 559 species of flowering plants, with 45 being newly recorded for this region. This work provided important information about the vegetation of Cyrenaica. Cavara (1925) in his work *La Flora Della Libia*, described 271 species of flowering plants, with 41 species being recorded for the first time in Cyrenaica. On the go, Maugini (1931) made observations of the pastures of Cyrenaica, and reported that this vegetation was represented by some 35 families of flowering plants. He provided detailed information on the composition of pastures in the Barce, Cyrene and Derna regions. Pampanini (1931) published *Prodromo Della Flora Cirenaica*, which dealt with the history of plant collecting in this region from 1707 until 1930, and included all groups of plants from algae to angiosperms in Cyrenaica. He described species and provided keys for their identification. Keith (1965) published *A Preliminary Check List of the Flora of Libya*, and made many remarks about the uses of plants along with listing their vernacular names. El-Mokasabi (2001) reported that El-Fateh University (1976), with the financial support of the Arab Development Institute, took up the flora of Libya project. The results were published between 1976 and 1989. Recently, many studies have been conducted on various valleys in the region, with the most significant being Wadi Murqus (El-Sherif *et al.*, 1991), Wadi Belkaf (Alaib *et al.*, 2016), Wadi Al-Agar (Alaib *et al.*, 2017), Wadi El- Enaghar (Omar *et al.*, 2021) and. Wadi Om-El-Amaym (Elfarse *et al.*, 2024) The study aimed to analyse the vegetation, prepare a preliminary list of flowering plant species, and evaluate the life-forms and diversity in the Derna region of Al-Jabal Al-Akhdar.

Materials and Methods

The study area is located in the eastern region of Libya, specifically in Al-Fatihah. It is bordered by Wadi Derna to the east, Karsah to the west, Al-Dhahr Al-Ahmar to the south, and the Mediterranean coast to the north. The study area is located on the second terrace of Al-Jabal Al-Akhdar, which lies in Wadi Derna in the Derna region, northeast Libya, where the wadi divides the city into two parts. It lies geographically between longitudes (33°00'-32° 30'N and 22°30'-22°45'E). The elevation of the wadi ranges between 40m to 300m above sea level Figure (1).

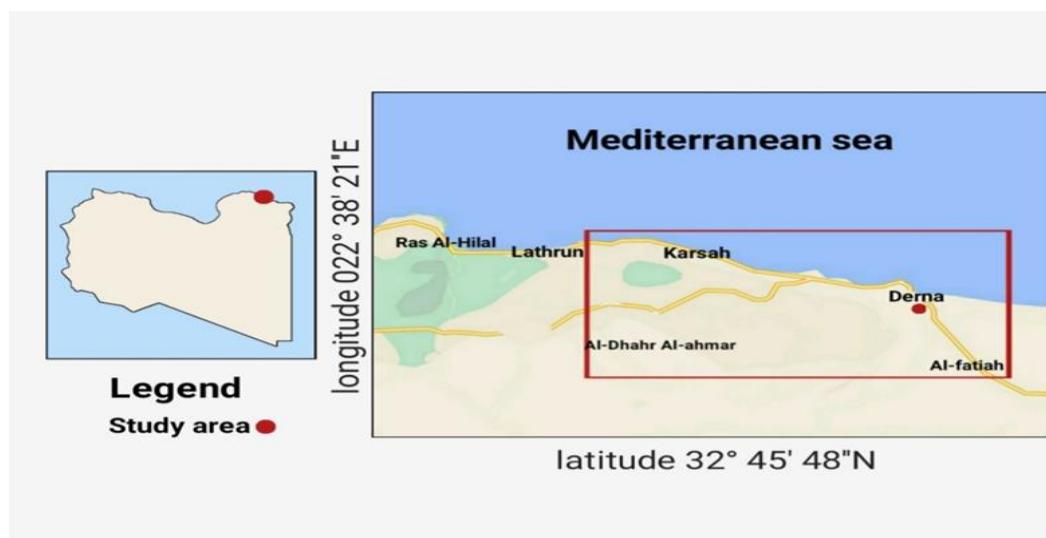


Figure 1: A map showing the study area

Specimen collection.

Fieldwork was conducted over 12 months to ensure comprehensive specimen collection and vegetation observation across various parts of the study area. During this time, at least one field trip was carried out each month, with increased frequency during the rainy seasons and spring when the majority of plants were in flowering condition. Dried plants using old newspaper and used a wooden press after coordinating the parts of the sample in the press paper, especially when it is juicy so that the leaves are spread out and the branches close to each other, One of the things that was taken into account is trimming the samples and reducing their density to prevent the parts from stacking on top of each other. The newspaper papers are changed day after day until the plant samples are completely dried and after making sure that they are dry and then pasted on paper, using glue and recording all data and information in the data card, most plants were photographed to help identify them, the encyclopedia of Libyan flora was used in the definition of plants. The identification of the specimens was carried out according to Ali & Jafri (1976-1977), Jafri & El-Gadi (1986) & El-Gadi (1988-1989). Then write down the correct scientific names for it and all specimens were deposited in the herbarium of the silphium in the Department of Botany at the Faculty of Science at Omar Al-Mukhtar University. Plant will have classified into life form according to Raunkiaer (1934).

Results and Discussion

Floristic analysis

Taxa collected from the study area are enumerated here. The arrangement of families, genera, and species is alphabetical. In this study, a total of 219 species were collected and defined (Table 1), belonging to 192 genera and 72 families.

Table 1: List of the plant species of the study area.

Scientific name	Family	Vernacular name	Life form
<i>Adiantum capillus-veneris</i> L.	Adiantaceae	Kazbarat albir	HCR
* <i>Aptenia cordifolia</i> (L.) N.E. Brown	Aizoaceae	Qatar Nudi	CHA
* <i>Carpobrotus edulis</i> (L.) N. E. Brown	Aizoaceae	Asabie zainab	CHA
<i>Mesembryanthemum crystallinum</i> L.	Aizoaceae	Thalaj Ghasul	THE
<i>Mesembryanthemum nodiflorum</i> L.	Aizoaceae	Ghasul	THE
* <i>Allium cepa</i> L.	Amaryllidaceae	Basal	CRY
<i>Allium ampeloprasum</i> L.	Amaryllidaceae	Albasila.	CRY
<i>Allium roseum</i> L.	Amaryllidaceae	Althuwima	CRY
* <i>Annona cherimola</i> . Mill.	Annonaceae	Qishta	PHA
<i>Apium graveolens</i> L.	Apiaceae	Crafes Kasbar	THE
<i>Daucus carota</i> L.	Apiaceae	Jizr bariu	THE
<i>Helosciadium nodiflorum</i> (L.) Koch	Apiaceae	Kidhbat aljirjir	THE

<i>*Petroselinum crispum</i> (Mill.) Hill	Apiaceae	Maedinus	THE
<i>Seseli tortuosum</i> L.	Apiaceae	Kalkh	HCR
<i>Scandix pecten-veneris</i> L.	Apiaceae	Qanqash	THE
<i>Smyrnium olusatrum</i> L.	Apiaceae	Ajbirni	HCR
<i>Thapsia gerganica</i> Lag.	Apiaceae	Deryas	CRY
<i>Arum cyrenaicum</i> Hruby	Araceae	Alriynsh	CRY
<i>Colocasia antiquorum</i> Schott.	Araceae	Qaliqas	CRY
<i>Artemisia herba alba</i> Asso	Asteraceae	Shayh	CHA
<i>Anacyclus clavatus</i> (Desf.) Pers.	Asteraceae	Alqurisa	THE
<i>Bellis sylvestris</i> Cyr. var. <i>cyrenaica</i> Beguinot	Asteraceae	Eayn alnaeja	CHA
<i>Calendula officinalis</i> L.	Asteraceae	Eayan alrakhmah	THE
<i>Carduus pycnocephalus</i> L.	Asteraceae	Shuk hansh	THE
<i>Carthamus lanatus</i> L.	Asteraceae	Qus	THE
<i>Centaurea alexandrina</i> Delile	Asteraceae	Murir	THE
<i>Chrysanthemum segetum</i> L.	Asteraceae	Alaiqahwan	THE
<i>Cichorium intybus</i> L.	Asteraceae	Mueaqada	THE
<i>Cynara cyrenaica</i> Maire & Weiller	Asteraceae	Qamoul	CHA
<i>Evax pygmaea</i> (L.) Brot.	Asteraceae	Alluwban	THE
<i>Helichrysum stoechas</i> (L.) Moench	Asteraceae	Eushbat aliarnab	CHA
<i>*Lactuca sativa</i> L.	Asteraceae	Khas	CRY
<i>Matricaria aurea</i> (Loefl.) Sch. Bip.	Asteraceae	Qamila	THE
<i>Notobasis syriaca</i> (L.) Cass.	Asteraceae	Shawkat alraqita	THE
<i>Pallenis cyrenaica</i> Alavi	Asteraceae	Alquranza	CHA
<i>Phagnalon rupestre</i> (L.) DC.	Asteraceae	Tiemat alarnab	THE
<i>Reichardia tingitana</i> (L.) Roth	Asteraceae	Nakad	THE
<i>Scolymus hispanicus</i> L.	Asteraceae	Scolymus	HCR
<i>Scorzonera undulata</i> Vahl	Asteraceae	Dhabah	THE
<i>Silybum marianum</i> (L.) Gaertner	Asteraceae	Shawkat alragita	THE
<i>Sonchus oleraceus</i> L.	Asteraceae	Tefaf	THE
<i>Onopordum cyrenaicum</i> Maire & Weiller	Asteraceae	Kharshuf	THE
<i>Nerium oleander</i> L.	Apocynaceae	Defla	PHA
<i>Periploca angustifolia</i> Labill.	Asclepiadaceae	Halaab	CHA
<i>*Phoenix dactylifera</i> L.	Arecaceae	Nakhl	PHA
<i>Pistacia lentiscus</i> L.	Anacardiaceae	Batom	PHA
<i>Anchusa azurea</i> Mill.	Boraginaceae	Lisan althawer	HCR
<i>Cerinthe major</i> L.	Boraginaceae	(Sirint) Fawayla	THE
<i>Echium angustifolium</i> Mill.	Boraginaceae	ALharisha	THE
<i>Echium plantaginium</i> L.	Boraginaceae	ALharisha	THE
<i>Biscutella didyma</i> L.	Brassicaceae	Alfils	THE
<i>Brassica oleracea</i> L.	Brassicaceae	Karanb	CRY
<i>Cakile maritima</i> Scop.	Brassicaceae	Asalih	THE
<i>Didesmus aegyptius</i> (L.) Desv.	Brassicaceae	Allsalis	THE
<i>Lepidium draba</i> L.	Brassicaceae	Jinibara	THE
<i>Matthiola incana</i> (L.) R. Br.	Brassicaceae	Manthur	CHA
<i>Matthiola longipetale</i> (Vent.) DC.	Brassicaceae	Alshaqara	THE
<i>Nasturtium officinale</i> R. Br.	Brassicaceae	ALqura	THE
<i>*Raphanus sativus</i> L.	Brassicaceae	Fajal	THE
<i>Sinapis alba</i> L.	Brassicaceae	Harra - Khardal	THE
<i>*Tecoma stans</i> Juss.	Bignoniaceae	Tecumah	PHA
<i>Capparis spinosa</i> L. var. <i>krugeriana</i> (Pamp.) Jafri	Capparaceae	Kabbar	PHA
<i>*Carica papaya</i> L.	Caricaceae	Babaya	PHA
<i>*Dianthus caryophyllus</i> L.	Caryophyllaceae	Quranful	CHA
<i>Spergularia rubra</i> (L.) J. & C. Presl	Caryophyllaceae	Nacima	THE

<i>Viburnum tinus</i> L.	Caprifoliaceae	Marnakh	PHA
<i>Lonicera nummularifolia</i> Jaub. & Spach.	Caprifoliaceae	Gemt ftha	PHA
<i>Atriplex halimus</i> L.	Chenopodiaceae	Qatf	PHA
* <i>Beta vulgaris</i> L.	Chenopodiaceae	Sulug	THE
<i>Chenopodium murale</i> L.	Chenopodiaceae	Bu jinzira	THE
* <i>Spinacia olearacea</i> L.	Chenopodiaceae	Spinach	THE
<i>Cistus parviflorus</i> Lam.	Cistaceae	Birbish	CHA
<i>Convolvulus arvensis</i> L.	Convolvulaceae	Ealayq	THE
<i>Convolvulus althaeoides</i> L.	Convolvulaceae	Ealayq	THE
<i>Cuscuta monogyna</i> Vahl	Convolvulaceae	Hamul	PAR
* <i>Ipomoea carnea</i> Jacq.	Convolvulaceae	Aithiman	PHA
* <i>Ipomoea hederacea</i> (L.) Jacq.	Convolvulaceae	Ealayq	PHA
<i>Sedum rubens</i> L.	Crassulaceae	Thadan alghula	CHA
<i>Ecballium elaterium</i> (L.) A. Rich.	Cucurbitaceae	Tarabiga	THE
<i>Juniperus phoenicea</i> L.	Cupressaceae	Arar	PHA
<i>Juniperus oxycedrus</i> L.	Cupressaceae	Arar shawki	PHA
<i>Cupressus sempervirens</i> L. var. <i>horizontalis</i> (Mill.) Gordon	Cupressaceae	Al-Sarow	PHA
<i>Scirpus holoschoenus</i> L.	Cyperaceae	Aldays	THE
<i>Tamus communis</i> L.	Dioscoreaceae	Ealayq	CRY
<i>Arbutus pavarii</i> Pamp	Ericaceae	Shamari	PHA
<i>Erica sicula</i> Guss.	Ericaceae	ALhamra	CHA
<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	Halabilab	THE
• <i>Euphorbia characias</i> L.	Euphorbiaceae	Halabilab	CHA
• <i>Euphorbia dendroides</i> L.	Euphorbiaceae	Tagmo	CHA
• <i>Euphorbia peplus</i> L.	Euphorbiaceae	Libana	THE
<i>Mercurialis annua</i> L.	Euphorbiaceae	Bu jinzira	THE
• <i>Ricinus communis</i> L.	Euphorbiaceae	Kherua	CHA
<i>Equisetum romosissimum</i> . Desf.	Equisetaceae	Qardab amyh.	THE
<i>Anthyllis tetraphylla</i> L.	Fabaceae	Ghurimbush.himar	THE
<i>Astragalus hamosus</i> L.	Fabaceae	Deqis	THE
* <i>Acacia karroo</i> Hayne	Fabaceae	Talih alban	PHA
* <i>Acacia cyanophylla</i> Lindley	Fabaceae	Alsint	PHA
* <i>Bauhinia seem</i> Keith.	Fabaceae	Khafa aljamal	PHA
<i>Calicotome villosa</i> (Poir.) Link	Fabaceae	Qundul	CHA
<i>Ceratonia siliqua</i> L.	Fabaceae	Carob	PHA
* <i>Delonix regia</i> (Bojer) Rafin.	Fabaceae	Bunisvana	PHA
<i>Genista acanthoclada</i> . DC.	Fabaceae	Shifshaf	PHA
<i>Lotus corniculatus</i> L.	Fabaceae	Krisht ajdi	THE
<i>Medicago turbinata</i> (L.) All.	Fabaceae	Allasqa	THE
<i>Melilotus indicus</i> (L.) All.	Fabaceae	Hundiquq	THE
<i>Ononis natrux</i> L.	Fabaceae	Garmbush	CHA
<i>Retama raetam</i> (Forsk.) Webb	Fabaceae	Alrutm	CHA
<i>Tetragonolobus purpureus</i> Moench.	Fabaceae	Gramboush	THE
<i>Trifolium leucanthum</i> M. Bieb.	Fabaceae	Nafl	THE
<i>Trifolium purpureum</i> Lois.	Fabaceae	Nafl	THE
<i>Vicia sativa</i> L.	Fabaceae	Jilban	THE
<i>Vicia tetrasperma</i> (L.) Schreb.	Fabaceae	Alhawhi	THE
<i>Quercus coccifera</i> L.	Fagaceae	Baluwt	PHA
<i>Fumaria bastardi</i> . Bor.	Fumariaceae	Maedinus himar	THE
<i>Erodium hirtum</i> . (Forsk.) Will.	Geraniaceae	Tamir	THE
* <i>Pelargonium odoratissimum</i> (L.) Soland.	Geraniaceae	Eatrashan	CHA
<i>Globularia alypum</i> L.	Globulariaceae	Alzariqa	PHA
<i>Iris germanica</i> L.	Iridaceae	Kaeayb altayib	CRY

<i>Ajuga iva</i> (L.) Schreb.	Lamiaceae	Shandaqura	THE
* <i>Ballota pseudodictamnus</i> (L.) Benth.	Lamiaceae	Almayla	CHA
<i>Marrubium vulgare</i> L.	Lamiaceae	Rubee	CHA
<i>Marrubium alysson</i> L.	Lamiaceae	Rubee	CHA
* <i>Mentha longifolia</i> (L.) Huds.	Lamiaceae	Naenae sueudi	THE
* <i>Mentha spicata</i> L.	Lamiaceae	Naenae	THE
<i>Micromeria Juliana</i> (L.) Benth.	Lamiaceae	Zaetar	CHA
<i>Micromeria nervosa</i> (Desf.) Benth.	Lamiaceae	Anmitima	THE
<i>Nepeta scordotis</i> L.	Lamiaceae	Nabita	CHA
* <i>Ocimum basilicum</i> L.	Lamiaceae	Habag	CHA
* <i>Origanum majorana</i> L.	Lamiaceae	Murtagush	CHA
<i>Phlomis floccosa</i> D. Don	Lamiaceae	Zuhayra	CHA
<i>Prasium majus</i> L.	Lamiaceae	Eanib aldhiyb	CHA
<i>Rosmarinus officinalis</i> L.	Lamiaceae	Alaklil	CHA
<i>Salvia fruticosa</i> Mill.	Lamiaceae	Tufaah alshaay	CHA
<i>Salvia rosmarinus</i> Schleid.	Lamiaceae	Aklil	PHA
<i>Satureja thymbra</i> L.	Lamiaceae	Zaatar	THE
<i>Stachys tournefortii</i> Poir.	Lamiaceae	Aquequs himar	THE
<i>Teucrium brevifolium</i> Schreb	Lamiaceae	Aleawda	CHA
<i>Teucrium davaeanum</i> Coss.	Lamiaceae	Jaeda	CHA
<i>Teucrium polium</i> L.	Lamiaceae	Jaeda	CHA
<i>Androcymbium gramineum</i> (Cav.) Mc	Liliaceae	Qurshudat alkhayl	CRY
<i>Asphodelus microcarpus</i> Salzm.& Viv.	Liliaceae	Aleunsul	CRY
<i>Bellevia mauritanica</i> Pomel	Liliaceae	Bilbush	CRY
<i>Bellevia sessiflora</i> (Viv.) Kunth	Liliaceae	Bilbush	CRY
<i>Linum usitatissimum</i> L.	Linaceae	Kettan	THE
* <i>Alcea rosea</i> L.	Malvaceae	Khatmia	CHA
<i>Lavatera bryoniifolia</i> Mill.	Malvaceae	Bryony	CHA
<i>Malva parviflora</i> L.	Malvaceae	Khoubbiza	THE
<i>Malva aegyptia</i> L.	Malvaceae	Khabaz	THE
<i>Melia azedarach</i> L.	Meliaceae	Sebbahi	PHA
* <i>Ficus carica</i> L.	Moraceae	Karmus	PHA
* <i>Morus nigra</i> L.	Moraceae	Tut	PHA
<i>Eucalyptus cosmophylla</i> F. Muell	Myrtaceae	Kafur	PHA
<i>Myrtus communis</i> L.	Myrtaceae	Birsim	PHA
* <i>Jasminum grandiflorum</i> L.	Oleaceae	Yasamine derna	PHA
* <i>Jasminum officinale</i> L.	Oleaceae	Yasamin shami	PHA
* <i>Olea europaea</i> L.	Oleaceae	Zaitoon	PHA
<i>Phillyrea latifolia</i> L.	Oleaceae	Sakhaba	PHA
<i>Orobancha mutellii</i> Schultz	Orobanchaceae	Hallock	PAR
<i>Oxalis pes-caprae</i> L.	Oxalidaceae	Hommeda	CRY
<i>Glaucium flavum</i> Cranz	Papaveraceae	Zaha liandar	THE
<i>Papaver rhoeas</i> L.	Papaveraceae	Alsalia	THE
<i>Pinus halepensis</i> Mill.	Pinaceae	Senouber	PHA
<i>Aegilops ventricosa</i> Tausch	Poaceae	Doser	THE
<i>Avena barbata</i> Pott & Link	Poaceae	Khafur	THE
<i>Bromus madritensis</i> L.	Poaceae	Shaeiria	THE
<i>Hordeum murinum</i> L. ssp. <i>leporinum</i> (Link) Arcang.	Poaceae	Bw aishtaraythuh	THE
* <i>Hordeum vulgare</i> L.	Poaceae	Shaeir	THE
<i>Lamarckia aurea</i> (L.) Moench	Poaceae	Bieubus alfar	THE
<i>Lolium rigidum</i> Gaud.	Poaceae	Alsaama	THE
<i>Phalaris minor</i> Retz.	Poaceae	khirfar	THE
<i>Piptatherum miliaceum</i> (L.) Coss.	Poaceae	Safsifa	THE

<i>Poa annua</i> L.	Poaceae	Qaba	THE
<i>Rostraria cristata</i> (L.) Taveler	Poaceae	Zare alnamla	THE
<i>Setaria verticillata</i> (L.) P. Beauv.	Poaceae	Allasqa	THE
<i>Rumex vesicarius</i> L.	Polygonaceae	Humayda	THE
<i>Polygonum aviculare</i> L.	Polygonaceae	Qardab	THE
<i>Polygonum equisetiforme</i> Sm.	Polygonaceae	ALtafawah	CHA
<i>Portulaca oleracea</i> L.	Portulacaceae	Abilibsha	THE
<i>Plantago major</i> L.	Plantaginaceae	Masis	THE
<i>Limonium thouinii</i> (Viv.) O. Ktze.	Plumbaginaceae	Euaydharan	THE
<i>Plumbago auriculata</i> Lam.	Plumbaginaceae	Jasmine	PHA
<i>Anagallis arvensis</i> L.	Primulaceae	Libiin	THE
<i>Cyclamen rohlfsianum</i> Asch.	Primulaceae	Rakaf	CRY
<i>Samolus valerandi</i> L.	Primulaceae	Libayn alma	HCR
* <i>Punica granatum</i> L.	Punicaceae	Rumaan	PHA
<i>Ranunculus asiaticus</i> L.	Ranunculaceae	Zaghalil	CHA
<i>Clematis cirrhosa</i> L.	Ranunculaceae		THE
<i>Reseda lutea</i> L.	Resedaceae	Baliha	THE
<i>Rhamnus lycioides</i> L.	Rhamnaceae	Salof	PHA
<i>Ziziphus lotus</i> (L.) Lam.	Rhamnaceae	Sadr	PHA
* <i>Eriobotrya japonica</i> (Thunb.) Lindl.	Rosaceae	Nasibiqli	PHA
* <i>Pyrus communis</i> L.	Rosaceae	Ainjas	PHA
* <i>Rosa damascena</i> Mill.	Rosaceae	Warad alshaay	PHA
<i>Rubus sanctus</i> Schreb.	Rosaceae	Tut bariy	CHA
<i>Sanguisorba minor</i> Scop.	Rosaceae	Maraqah	HCR
<i>Sacropoterium spinosum</i> (L.) Spach	Rosaceae	Shabraqa.	CHA
<i>Valantia hispida</i> L.	Rubiaceae	Allasqa	THE
* <i>Citrus aurantium</i> L.	Rutaceae	Bertgal	PHA
* <i>Ruta chalepensis</i> L.	Rutaceae	Fayajil	CHA
<i>Linaria triphilla</i> (L.) Mill.	Scrophulariaceae	Om lawlad	THE
<i>Scrophularia canina</i> L.	Scrophulariaceae	Eushbat alghula	THE
<i>Hyoscyamus albus</i> L.	Solanaceae	Binj-Ghengheet	THE
<i>Nicotiana glauca</i> R.C. Graham	Solanaceae	Akkuzemosa	PHA
* <i>Solanum lycopersicum</i> L.	Solanaceae	Tamatim	THE
<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Foul el kalb	CHA
<i>Thymelaea hirsuta</i> (L.) Endl.	Thymelaeaceae	Metnan	PHA
<i>Typha domingensis</i> (Pers.) Poir. & Steud.	Typhaceae	Birabit	HEL
<i>Parietaria judaica</i> L.	Urticaceae	Lasiqa	CRY
<i>Urtica pilulifera</i> L.	Urticaceae	Horrag	THE
<i>Urtica urens</i> L.	Urticaceae	Horrag	THE
<i>Fedia caput-bovis</i> Pomel	Valerianacea	Allubayina	THE
<i>Fedia cornucopiae</i> (L.) Gaertner	Valerianacea	Libiin	THE
<i>Valerianella discoidea</i> (L.) Loisel	Valerianacea	bo daqqa	THE
* <i>Lantana camara</i> L.	Verbenaceae	Lanta	PHA
* <i>Vitex agnus-castus</i> L.	Verbenaceae	kafi Mariam	CHA
* <i>Vitis vinifera</i> L.	Vitaceae	Anab	PHA
<i>Fagonia cretica</i> L.	Zygophyllaceae	Dalaf aleajuz	THE
<i>Peganum harmala</i> L.	Zygophyllaceae	Harmel	CHA

* Cultivated.

Abbreviation: THE=Therophyte, PHA= Phanerophyte, CHA= Chamaephyte, CRY= Cryptophyte, HCR= Hemicryptophyte, HEL=Helophyte. PAR: Parasite.

The distribution of species across families in the study area suggests a flora that is relatively modest in diversity. The most prominent families in terms of species were Asteraceae with 23 species, followed by Lamiaceae with 21 species, Fabaceae with 19 species, Poaceae with 12 species and Brassicaceae with 10 species.

The remaining families were represented by fewer than nine species, each occupying different habitats. The comparison of the number of species recorded in this study among large families is similar to that of other studies conducted in different regions of Libya by (Omar *et al.*, 2021), Elfarse *et. al.*, 2024, and (Alaib *et al.*, 2017).

The species collected from the study area included 176 wild species that grow naturally within the study area and in the forests surrounding the study area, and 43 species cultivated inside homes, gardens, streets and agricultural fields. All plant species were recorded in a table including the correct scientific names and plant families with local and common names and a picture of the life of each plant species based on the Rankier's system. El-Moksabi & Makhluf (2020).

Endemic plants.

The study area was characterized by presence of endemic plants, ten species of endemic plant are recorded belonging to 10 genera, 10 species, and 7 families. Our near- endemics are species known only in Libya and Egypt, or in Libya and Crete such as *Bellevia sessiflora*, *Centaurea alexandrine* and *Stachys tournefortii*. (Table 2).

Table 2: The endemic names of the studied plants.

Scientific name	Family
<i>Arum cyrenaicum</i> .	Araceae
<i>Arbutus pavarii</i> .	Ericaceae
<i>Bellis sylvestris</i> .	Asteraceae
<i>Cynara Cyrenaica</i> .	Asteraceae
<i>Capparis spinosa</i> .	Capparaceae
<i>Cupressus sempervirens</i> .	Cupressaceae
<i>Cyclamen rohlfsianum</i> .	Primulaceae
<i>Onopordum cyrenaicum</i>	Asteraceae
<i>Pallenis Cyrenaica</i>	Asteraceae
<i>Teucrium davaeanum</i>	Lamiaceae

Life form.

A total of 219 species recorded in the study area were described and classified into life forms according to Raunkiar's classification based on height of perennating bud form the ground (Raunkiar's, 1934). The biological spectrum of the study area is summarized as follows: Phanerophytes: 47 species, accounting for 21.5 % of the total flora. This category represents the taller woody plants and trees, indicating their adaptation to the region's climatic conditions; Chamaephytes: 44 species, constituting 20 %. These low-growing shrubs are well-suited for arid and semi-arid regions, reflecting the local environmental conditions; Cryptophytes: 17 species, making up 7.7 %. These plants, often bulbous or rhizomatous, reflect an adaptation to seasonal climatic variations; Hemicyptophytes are represented by seven species, accounting for a mere 3 % of the total. This indicates a limited presence of herbaceous perennials that are adapted to temperate climates. Parasites represented by two species, accounting for a mere 0.9 % of the total. Helophyte is the smallest category, represented by only one species, accounting for 0.45 % of the total. Therophytes: The largest category, comprising 101 species accounting for 46 %._The dominance of annuals highlights the prevalence of seasonal vegetation adapted to the arid environment. The classification of life forms provides valuable insight into the floristic structure of a community. By converting the proportion of species in each life form into percentages, a life-form spectrum can be created, which reflects the ecological adaptation of species in a particular area (Whittaker, 1975). This is illustrated in Figure 2. This data is particularly useful for environmental planning and management, especially in regions that are vulnerable to desertification and climate change.

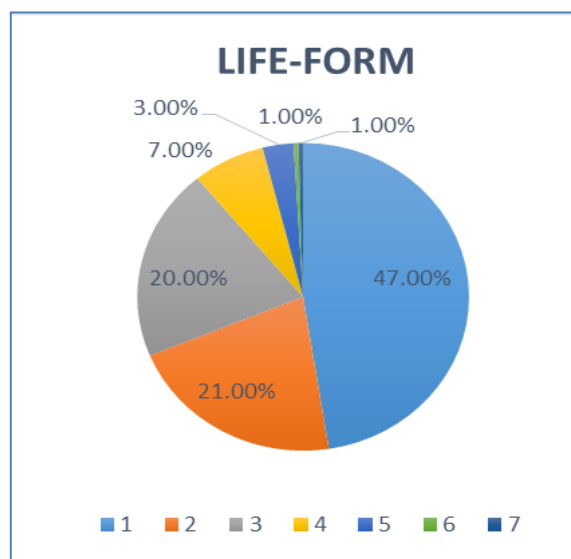


Figure 2: Life form spectrum of the recorded species in the study area.

This study showed that plant density was greatest at the bottom of the valleys. This may be due to the favourable environmental conditions in these locations (in both Wadi Derna and Wadi Karsa).

A small number of gymnosperm plants were collected from the study area. These are all tree and shrub species with needle-like leaves that produce cones instead of fruit, and they emit an aromatic scent. Examples include *Juniperus phoenicea*, *J. oxycedrus*, *Cupressus sempervirens* and *Pinus halepensis*.

Some climbing plants, such as *Clematis cirrhosa* and *Tamus communis*, have been observed to grow on other species. This can be due to the weakness of these plants or the nature of their growth. Through field trips conducted in the study area, species of parasitic plants were recorded, which parasitise and live on other plants. Among the species recorded in the study area are *Orobancha mutelii* and *Cuscuta monogyna*, which were found parasitising in a coiled form on *Ipomoea carnea*, a plant belonging to the Convolvulaceae. The study area contains rocks and caves, providing a suitable environment for chasmophytes - plants that can grow on rocks or hang from caves and rocky lands. Several chasmophytes were observed in the study area, including *Adiantum capillus-veneris*, *Matthiola incana*, *Erodium hirtum*, *Juniperus phoenicea*, *Myrtus communis*, and *Artemisia herba alba*. Due to the abundance of water within the study area, especially near the farms, as well as the surplus of water from canals, streams, and waterfalls, the study area contains an important composition of aquatic plants such as *Adiantum capillus-veneris*, *Colocasia antiquorum*, *Samolus valerandi*, *Mesembryanthemum nodiflorum*, *Plantago major*, *Nasturtiopsis officinale*, *Cuscuta monogyna*, and others.

References

1. Alaib, Mohamed Adrawi, Ali M. Elbakkosh, Yousef B Ali, Abdulati S. Gadelmola, and Abdurrahman M. Elmhafdi (2016). Preliminary Investigation of the Vegetation of Wadi Belkaf- Bata Al-Jabal Al-Akhdar- Libya. *Libyan Journal of Basic Science (LJBS)*, 4(1) :20-27.
2. Alaib, Mohamed Adrawi, Imhemed El- Sherif and Ramadan I. Al-Hamed (2017). Floristic and ecological investigation of Wadi Al—Agar in Al-Jabal Al- Akhdar- Libya. *Journal of Science & its applications (JS&A)*, 5(1): 57-61.
3. Ali SI and Jafri SMH. Flora of Libya. (1976-1977); 1-24. Department of Botany, Al- Faateh University, Tripoli, Libya.
4. Al-Zwam S.M. (1995). Study in geography natural Al- Jabal Al- Akhdar. Benghazi university- Benghazi, Libya.
5. Boulos L. (1972). Our present knowledge on the flora and vegetation of Libya. *Webbia*. 26: 366-400.
6. Boulos, L. (1970). Medicinal herbs in Libya. Al-Hasad 16, Esso Standard Libya Incorporation Publication Beirut, Lebanon.
7. Boulos, L. (1975). The Mediterranean element in the flora of Egypt and Libya. In *La Flore du Bassin Méditerranéen : Essai de Systématique Synthétique*. Colloques Internationaux du C.N.R.S. 235(119-124).
8. Cavara, F. (1925). La Flora Della Libya. *Atti Della Soc. It. per IL Progresso della Scienze* Vol. 14: 24-28.

9. Durand, E. and Barratte, G. (1910). *Florae Libycae Prodrum.* Catalogue Raisonne des Plantes de Tripolitaine, Genève.
10. El- Barasi, Y.M. and Saaed.M.W. (2013). Threats to plant Diversity in the North Eastern Part of Libya (El-Jabal El- Akahdar and Marmarica Plateau). *Journal of Environmental Science and Engineering*; 2: 41-58.
11. El-Darier, S.M. and El-Mogaspi, F.M. (2009). Ethnobotany and Relative Ethnobotany and Relative Importance of Some Endemic Plant Species at Al-Jabal Al-Akhdar Region (Libya). *World Journal of Agricultural Sciences*. Vol. 5 (3): 353-360.
12. Elfarse, M.H., Omar, N., Al-Zerbi, A.K., Alaib, M.A., El-Awamie, M.W., Bleiblo, F.A. (2024). Floristic Diversity, Life-Form Composition, and Anthropogenic Pressures on The Vegetation of Wadi om-El-Amaym in Al-Jabal Al-Akhdar, Northeastern Libya. *International Journal for Multidisciplinary Research (IJFMR)*. 6 (6):1-12.
13. El-Gadi A. 1988-1989 Flora of Libya. Department of Botany, Al- Faateh University, Tripoli, Libya. Vols. 145-14.
14. El-Mokasabi, F. M. (2010). The traditional use botanical composition of medicinal Theses, faculty of science and botany department, Alexandriaia university plants in the green mountain region, ph.D. Egypt.
15. El- Mokasabi, F. M. (2001). Certain studies Related to Cultivation of the Cyclamen plant (*Cyclamen rohlfsianum* Ash.) for Its Conservation. M.Sc. Thesis. Benghazi University, Libya.
16. El- Mokasabi, F. M. (2017). Studies on the flora of Libya. *Cont Res Online Lib*. 1(1),1-10.
17. Jafri S.M.H and El- Gadi A. (1986) Flora of Libya. Department of Botany, Al- Faateh University, Tripoli, Libya. 25-144.
18. El-Sherif, M.; Y. El-Barasi; M. Mugasabi; M. El –Adrawi; Y. Shakmahk; and M. Gomma. (1991). A Contribution to the flora of Wadi Marquis (Al-Jabal Al-Akhdar Libya) *Acta. Bot. India* 19: 232-235.
19. Keith, H.G. (1965). A Preliminary Check-list of Libyan Flora. 2 Vols. The Government of the Libyan Arab Republic, Ministry of Agriculture and Agrarian Reform, Tripoli, Libya.
20. Khakurel, D.Y. Uprety, S Rajbhandary. *J.pl Res*, (2020) Floristic Diversity of vascular plants in sikles region of annapurna conservation area nepal. *dpr. gov. np. vol.18*, pp 106.
21. Maugini, A. (1931). Contributo alla conoscenza dei prati e pascoli Natural del la Cirenaica Settentrionale. Ministero Della Colonie, Corti, Italy.
22. Omar N., Naser G. El-Mghrbi, Rebeh O Rahil, Mohamed A. Alaib and Abdul Hamid K. Alzerbi. (2021). Floristic Composition and Plant Diversity of Western Part of Wadi El- Enaghar, Libya. *Species*. 22(70): 204-217.
23. Pampanini, R. (1931). *Prodromo Della Flora Cirenaica*. Ministro Della Colonie, Rome.
24. Raunkiaer C. 1934 *The Life Forms of Plant and Statistical Plant Geography*. Oxford, Clarendon Press. London.
25. Trih A. (1971). *Libya Geography*. Knowledge Facility, Alexandria, Egypt.
26. Vaccari, E. (1914). Contributio alla flora Della Libya. Una Raccolte botanica dei dintorni di Tripoli. *Arch. Bot.*, 25: 189-219.

i.