

Contribution to a floristic study of the Ouezzane region (Prerif, North Atlantic Morocco-1)

Chriqui A.¹, Benkhniqeu O.², Moujahdi C.², El Khadir I.¹, Mouniane Y.¹, Zidane L.³, Hmouni D.¹

¹Laboratory of Natural Resources and Sustainable Development, Department of Biology, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

²Department of Botany and Plant Ecology, Scientific Institute, Mohammed V University in Rabat, Avenue Ibn Batouta, P.B. 703, Rabat-Agdal, 10106, Morocco

³Laboratory of Plant, Animal Productions and Agro-industry, Department of Biology, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

This study's main objective was to characterize the spontaneous vascular flora of the Asjen region and Brikcha forest. It was conducted in the study area Moroccan Atlantic North-1 (Man-1) in 2021–2022. The stratified sampling method combined with the records of the surface and itinerant survey methods were used as a basis to collect floristic data. Three hundred and eighty-four taxa belonging to 270 genera and 80 families were recorded, of which five species distributed among four families were new additions to the flora of the study area: *Crepis vesicaria* L. subsp. *stellata* (Ball) Babc and *Scorzonera hispanica* L. subsp. *hispanica* (Asteraceae), *Glinus lotoides* L. (Molluginaceae), *Juniperus oxycedrus* L. subsp. *oxycedrus* (Cupressaceae) and *Quercus coccifera* L. (Fagaceae). The biological spectrum indicates the dominance of therophytes (47.66%), followed by hemicryptophytes (16.93%). Dicotyledons represent the most dominant systematic group (305 taxa, 79.43%), followed by Monocotyledons (72 taxa, 18.75%). Six families are dominant and represent 46.62% of all identified species: Asteraceae (61 species, 15.89%), Fabaceae (32 species, 8.33%), Poaceae (30 species, 7.81%), Lamiaceae (26 species, 6.77%), Apiaceae (17 species, 4.43%) and Caryophyllaceae (13 species, 3.39%). The most species-rich genus is *Plantago*, with six species, followed by *Teucrium*, with five species. The rate of endemism is 6.51%, with 25 species, eight of which are strictly endemic to Morocco. Rare or threatened species represent 3.12% of total species (12 species), with seven taxa on the national red list.

Keywords: Plant diversity, Checklist, Ecology, Asjen, Brikcha forest, Morocco

INTRODUCTION

Morocco, in the northwestern end of Africa, separated from Spain by the Strait of Gibraltar and possessing a double Mediterranean and Atlantic seaboard, has a great climatic diversity and different bioclimatic stages: Saharan, arid, semi-arid, sub-humid, humid, and high mountain. It is an original natural location offering a full range of Mediterranean bioclimates, favoring a rich and varied flora with marked endemism (Benabid, 2000). The statistics published in the literature on the number of plant species in Morocco can vary remarkably depending on the source (Fennane *et al.*, 2023). Fennane and Ibn Tattou (2012) recorded 155 families, 981 genera, 3913 species, 426 standard subspecies (autonyms) and 872 additional subspecies.

Morocco has four major mountain ranges: Anti-Atlas in the south, Middle-Atlas and High-Atlas in the center, and the Rif in the northwest. The latter is one of the most biologically diverse regions of the Mediterranean; it has some of the rarest biogeographical areas in the world and an essential biodiversity, with many therapeutic plants (Sauvage, 1959; Bellakhdar, 1997).

The Rif, as the background of the Holarctic empire (Sauvage, 1959), includes many species of northern

stock, mostly rare. A hundred and two Ibero-Moroccan endemic taxa are found in the Rif, which is far superior to any other region (Fennane & Ibn Tattou, 1999). The Rif is subdivided into three main parts from North to South: the Intrarif, the Mesarif and the Prerif. The latter is a junction between two major structural units: the Rif Mountain range to the north and the Gharb plain to the south. The Prerif has not been explored much by botanists despite its major plant potential. The floristic studies there remain partial and fragmented; we note the three studies by Orch *et al.* (2013, 2014, 2021). Before the administrative division of 2009, the territorial municipality of Asjen was only the western geographical extension of the great massif of Izarene, part of the large Brikcha municipality. Its name appears in the list of proposed Important Plant Areas in Morocco (Fennane, 2004). This classification is not fortuitous but testifies to a botanical richness that should be studied.

Nowadays, in the territorial municipality of Asjen, most intact plants are reduced to scattered fragments whose areas vary from 205.9 ha to 0.4 ha. The situation in the Brikcha region is less threatened.

Floristic studies occur in renowned regions extending over large areas, such as forests, scrublands and

ARTICLE HISTORY

Submitted: July 31, 2023

Accepted: May 15, 2024

CORRESPONDANCE TO

Chriqui A.

Laboratory of Natural Resources and Sustainable Development, Department of Biology, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco
Email: ahmedchriqui1@gmail.com
DOI: 10.21608/ejbo.2024.226380.2439

EDITOR

Prof. Monier Abd El-Ghani,

Department of Botany and Microbiology, Faculty of Science, Cairo University Egypt
Email: moniermohamedabdelghani@gmail.com

©2024 Egyptian Botanical Society

national parks. On the other hand, although regions with small forest areas are rich in biodiversity, their floristic inventories display gaps that need to be filled, as in the study area. Thus, conducting a floristic study to establish the most exhaustive inventory possible is essential.

MATERIALS AND METHODS

Study area

This study was conducted on the relic fragments of the territorial municipality of Asjen and the forest of Brikcha (Canton of Zregfet, Brikecha region). This zone, with an area of 181.67 km² and a perimeter of 88.85 km, is located between 34°48'33" and 34°57'33" longitude North and 05°32'13" and 05°45'33" latitude West. It is administratively part of the Ouezzane province attached to the Tangier-Tetouan-Al Hoceima Region (Figure 1). It brings together 29 douars in the form of agglomerations scattered in the natural landscape and belongs to the southern zone of the Périfain domain. The altitudes range from 55 m at the edge of Oued Loukkos to 628 m recorded north of Mount Moulay Abdeslam Rebeta, part of the Canton Zregfet Forest. We note the existence of five well-individualized vertices. In North Atlantic Morocco (Man-1), the studied area appears on the map of phytogeographical divisions, while it is part of the thermo-Mediterranean stage on the vegetation map of Morocco (Benabid, 2000). Natural vegetation is only represented by forest fragments with surfaces ranging from 0.4 ha to 284.09 ha. The study area is delimited to the north by the territorial's municipalities of Tatoft and Brikcha and to the south by the three territorial's municipalities of Mesmouda, Ouezzane, and Bni Quolla. The territorial's municipalities of Amzfroun and Mesmouda are in the West, while the territorial's municipalities of Brikcha and Ain Beida are in the East (Centre des travaux Agricoles d'Asjen, 2014). The region has a Mediterranean climate, according to the Emberger climatogram; it belongs to the subhumid bioclimatic stage characterized by a dry summer with temperatures varying between 26–44°C and a cold to mild winter with temperatures between 1–8°C. Rainfall varies between 700–900 mm/year with interannual irregularity (Centre d'Invisissement de Tétouan, 2016). The plant cover is characterized by a fragmentary and heterogeneous floristic procession comprising evergreen meadow forest, dense matorral in the climax state, degraded matorral, and grassland. The relief comprises 38% of mountains, whose altitude does not exceed 628 m, 26% of hills and the

rest at low topographic levels (Centre des travaux Agricoles d'Asjen, 2014).

From a geological point of view, the region was formed by a layer of sedimentary cover carried by gravity from North to South during the uplift of the Rif in the Tortonian (Sutter & Fiecher, 1966). The sedimentary material of this aquifer comprises white limestone with flint from the Palaeogene and marl-limestone or marl-sandstone detrital deposits from the Miocene. Regarding the hydrographic network, the study area is part of the left watershed of Oued Loukkos. This permanent course is the northern natural limit of the study area. With permanent flow, except in successive years of drought, Oued Zaz, which originates at the foot of Jabel Bouhlal, is the main watercourse that crosses the study area from side to side over 33 km. Its width depends on the volume of water it discharges during the rainy season. Three main temporary tributaries join Oued Zaz at its mouth. Notably, the region hosts some small saltwater sources of low-flow geological origin. The precipitation level in the region and the drought length are two major factors on which the salinity of the sources depends. Oued El Malah is the most famous saline watercourse. From the end of spring until the beginning of autumn, the crystallization of salt molecules by heat generates a white layer of a few centimeters in thickness.

Study tools

Several materials were used to conduct this study:

- Topographic map of Ouezzane at 1/100 000 scale and topographic maps of Brikcha, Rhouna and Masmouda at 1/25 000 scale (Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie, 2022) ;
- SAS Planet software to download the study area's map;
- July 2022 satellite images downloaded from USGS;
- ArcGIS 10.8 software to process satellite images to geographically locate spaces with spontaneous vegetation, calculate surfaces and perimeter and length of wadis, and identify the hydrogeological network, relief, road network, clearing, "douars" and classification of land use (natural or anthropogenic vegetation).

Sampling and data collection

The method was based on fieldwork and supplemented by the computer processing of collected data. The study took place in two stages.

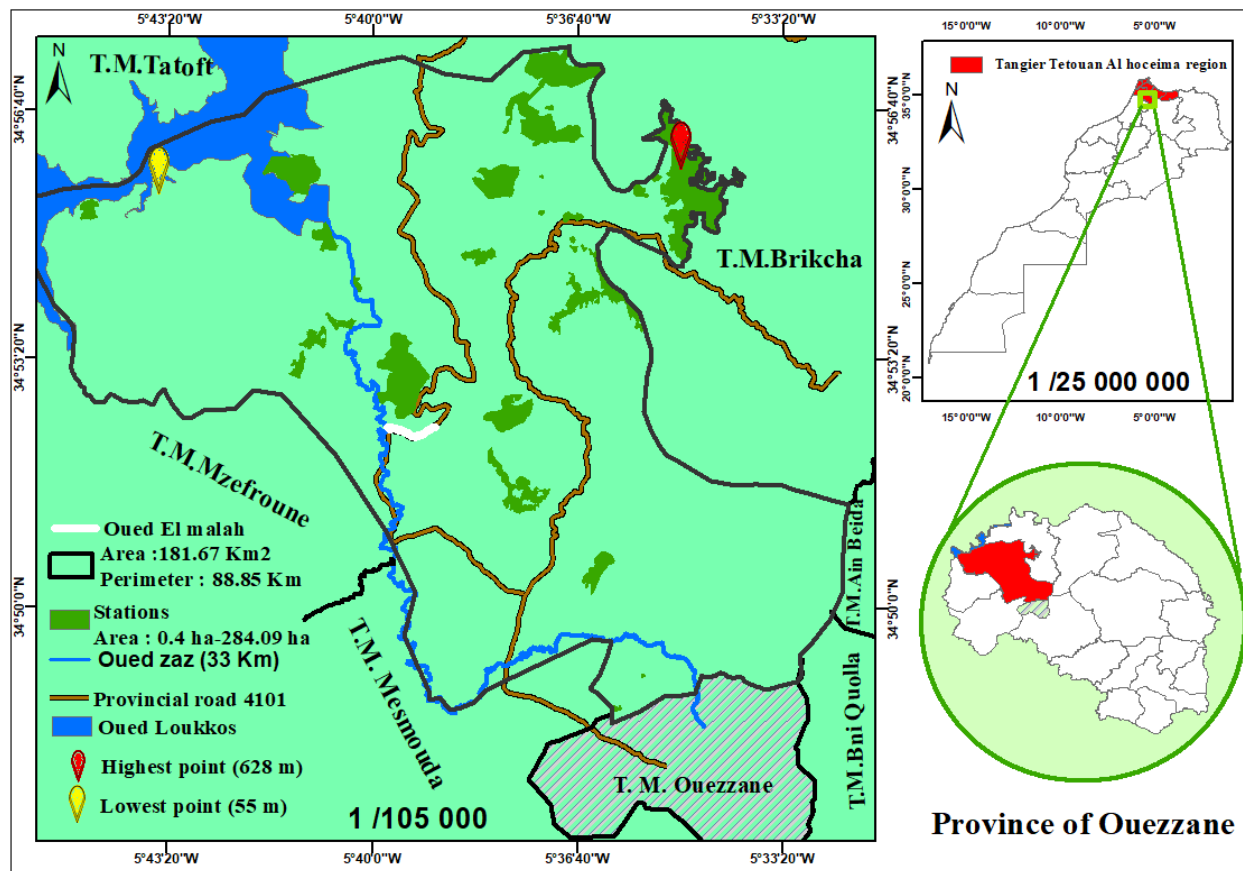


Figure 1. Geographic situation of the Ouezzane region (Prerif, North Atlantic Morocco-1).

Based on topographic maps and satellite images, a preliminary study aimed at delimiting the areas where the vegetation cover is found and the ways to access it was conducted. Next, descents on the field were conducted to observe the different areas where the spontaneous plant procession persists, become familiar with the study environment, and establish relationships with experts in the region. The second stage includes the floristic surveys.

Data was collected through field trips during the Fall of 2021 and in the first three seasons of 2022. To increase the chance of counting the maximum number of existing species, we associated three sampling methods and conducted repetitive and cumulative ironings on the same plots at different times of the year (along the growing and flowering seasons). The first method is the surface survey already used in several studies (Adou *et al.*, 2005; Gueulou *et al.*, 2018; Ghhoré *et al.*, 2020; Soro *et al.*, 2020). In each surveyed site, the surface survey was conducted according to the principle of the minimum area, which is the minimum surface beyond which no

increase in the number of species is observed even if the surface increases (Gounot, 1971). The number of readings depends on the size of the fragments. Thus, for large fragments > 60 ha, floristic inventories were made in square plots of 20 or 30 m on each side. Plots were chosen based on the physiognomy of the landscape and their geomorphological situation. In each plot, all plant species encountered (shrubs, lianas, or herbaceous) were collected. Herbaceous species are recognized by their leaves, stems, or inflorescences, while woody species are easily detected.

We also adopted a second stratified sampling method (Godron, 1971; Godron & Daget, 1982). Additionally, a third itinerant survey method was recruited to have as complete a floristic inventory as possible (Gueulou *et al.*, 2018; Gnahoré *et al.*, 2020; Grévin *et al.*, 2021). The floristic surveys were conducted on the following sites: Brikcha forest: Canton of Zregfet, Mount Dar Mouden-Meghoussa, Mount Asjen-Elkalaa, Mount Sidi Ali jawzi-Nouzha, Lands of Habouss Baajin and Dechiar, Lands of Habouss Kalaa, Lands of Dar Abbas

and Zeanen, and Ain Mechallou hill. Other scattered islets have also been studied in Hait Manaa and Jebel Seloum.

All encountered species were collected, photographed, and herbarized. The final identification of the collected taxa was confirmed at the Scientific Institute in Rabat using the appropriate botanical literature (Fennane & Ibn Tattou, 1998; Fannane *et al.*, 1999, 2007, 2014; Fennane & Ibn Tattou, 2005; Ibn Tattou & Fennane, 2008). The spectrum of the collected species' life forms was defined according to the classification system of Raunkiaer (1934). The nomenclature of plant taxa follows the World Flora Online (WFO, <http://www.worldfloraonline.org/>) and International Plant Names Index (IPNI, <https://www.ipni.org/>). The Red Book of the Vascular Flora of Morocco (Fennane, 2021) was used to specify the conservation status of each taxon.

The global list of species was compared with the Catalog of Rare, Threatened or Endemic Vascular Plants of Morocco (Fennane & Ibn Tattou, 1998) to identify rarity and endemism. The red book of the Vascular Flora of Morocco (Fennane, 2021) was used to categorize the taxa collected according to different evaluation criteria.

The floristic diversity of the study region is documented in the Appendix. This list begins with Pteridophytes, followed by Gymnosperms and Angiosperms. Within these groups, the systematic order of the families follows that of Flore pratique du Maroc (Fennane *et al.*, 1999, 2007, 2014). Within each family, the taxa are listed in alphabetical order. For each taxon, the following information was noted: accepted scientific name, life form, bioclimatic stage, flowering period, assessment criteria, endemism / rarity, and distribution area in the geographical divisions of Morocco (Fennane *et al.*, 1999, 2007, 2014).

RESULTS

Floristic analysis

A total of 384 taxa (including species and subspecies) distributed over 270 genera and 80 families have been identified in the study area (Appendix). Figure 2 indicated that the flora listed reveals a non-homogeneous distribution of species between four major systematic groups. Most of the species identified during the floristic analysis of the catalog belong to the Dicotyledonous Angiosperms with 305 species or 79.43% distributed among 211 genera grouped into 56 families.

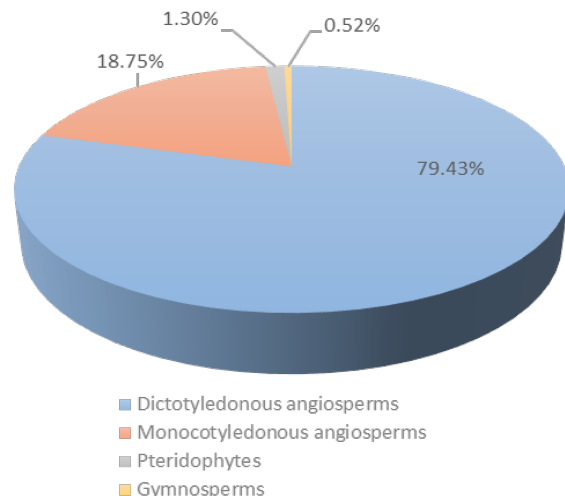


Figure 2. Distribution of the four systematic groups according to the number of species of the recorded species in Ouezzane region (Prerif, North Atlantic Morocco-1).

As for them, the Monocotyledonous Angiosperms are made up of 72 species distributed among 52 genera and 17 families. Calculation of the ratio: (number of monocotyledonous species (M) / number of dicotyledonous species (D))*100 is of the order of 23.60%, which is a little far from that found by Benkhniq *et al.* (2023): 13.43% in the Al Haouz Rehamna region, which corresponds phytogeographically to Middle Atlantic Morocco-4 (Mam-4).

Of the total of 384 species recorded, five species or 1.30% belonging to five genera and five families are the proportions of spore Tracheophytes. Gymnosperms are represented by only two species belonging to two genera (*Juniperus oxycedrus* L. subsp. *oxycedrus* and *Pinus halepensis* Miller).

In the present study, seven families having a number of species greater than or equal to 10 taxa share 49.22% of the total number (Figure 3), while seventy-three families share the remaining 50.78%. The monospecific, dispecific and trispecific families are represented respectively by 8.33%, 7.29% and 4.69%. While those whose number of species is between four and eight species represent 30.47%.

Flora analysis showed that the Asteraceae constitute the most specific family (61 taxa), followed by Fabaceae (32 taxa), Poaceae (30 taxa), Lamiaceae (26 taxa), Apiaceae (17 taxa), Caryophyllaceae (13 taxa), Asparagaceae (10 taxa), Cistaceae, Plantaginaceae and Scrophulariaceae (8 taxa each), Boraginaceae, Brassicaceae, Geraniaceae, Ranunculaceae and, Polygonaceae (6 taxa), Cyperaceae, Orchidaceae,

Campanulaceae, Convolvulaceae, Euphorbiaceae, Rubiaceae and Solanaceae (5 taxa each), Alliaceae, Amaranthaceae, Crassulaceae, Oleaceae, Orobanchaceae and Rosaceae (4 taxa each), Amaryllidaceae, Gentianaceae, Malvaceae, Papaveraceae, Rhamnaceae and Valerianaceae (3 taxa each) 14 families with 2 taxa each, and other 32 families each represented by a species.

The number of species varies from one genus to another and oscillates between 6 species and one species. The main genera are *Plantago* with 6 taxa; *Teucrium* with 5 species; *Allium*, *Campanula*, *Centaurea*, *Cistus*, *Geranium*, *Silene* and *Stachys* with 4 species each. Fifteen genera are each represented by three taxa and fifty-four genera are represented by two taxa. While the rest of the genera, one hundred and ninety-two, have only one taxon each.

Of the 384 species recorded, *Juniperus oxycedrus* L. subsp. *oxycedrus* is the flagship taxon. His unexpected discovery in six plants, very far from his usual places is of remarkable importance. It was discovered in two localities (GPS). Indeed, a few plants to the extreme south of the Brikcha forest: Canton of Zregfet and another plant on its southern third to the mid-upper eastern slope have taken refuge at an altitude of 364 to 480 m. This presence is tangible proof of the region's flourishing floral past. Thanks to the commendable efforts made by the National Agency for Water and Forests of Ouezzane, the six persistent relics are currently safe from all anthropic activities threatening them.

Life forms

The qualitative characterization of life forms revealed the presence of six biological forms with different proportions (Figure 4). Therophytes life forms are the most dominant forms (47.66%). In the second position come the hemicryptophytes with 16.93% followed by the geophytes with 14.32% followed by the phanerophytes (12.24%) while the chamaephytes occupy the fifth position with 7.29%. Fixed hydrophytes record the lowest percentage (1.56%).

Endemic species richness

In the study area, we counted 8 species strictly endemic to Morocco (E) (*Delphinium cossonianum*, *Fumaria ouezzanensis* subsp. *ouezzanensis*, *Genista clavata*, *Narcissus broussonetii*, *Silene ibosii*, *Stachys circinata* subsp. *zaiana*, *Teucrium barbarum* and *Teucrium decipiens*) and 17 species share endemism with neighboring countries. These quasi-endemic

species are distributed as follows: Six taxa endemic to Morocco and the Iberian Peninsula (EI): *Campanula lusitanica*, *Fedia cornucopiae*, *Linaria amethystea*, *Linum setaceum*, *Origanum compactum* and *Spergularia purpurea*. Eight endemics of Morocco, the Iberian Peninsula and Algeria (EIA): *Aristolochia baetica*, *Cytisus arboreus* subsp. *baeticus*, *Fumaria rupestris* subsp. *rupestris*, *Linaria latifolia*, *Malva hispanica*, *Mucizonia hispida* subsp. *hispida*, *Scrophularia sambucifolia* and *Trachelium caeruleum* subsp. *caeruleum*. A taxon endemic to Morocco and Algeria (EA): *Pallenis spinosa* subsp. *maroccana*, a taxon endemic to Morocco, the Iberian Peninsula and the Canary Islands (EIC): *Lotus arenarius* and a taxon suspected to be endemic to Morocco, the Iberian Peninsula, Algeria and the Canary Islands (EIAC?): *Cynara humilis*. The 25 species are divided into 15 families, the most represented of family was Lamiaceae (4 species), followed by Fabaceae (3 species each). The Asteraceae, Campanulaceae, Caryophyllaceae, Papaveraceae and Scrophulariaceae families are represented by only two species each.

Richness of rare or threatened species

In the study area, the analysis of the degree of rarity of the species recorded made it possible to differentiate 12 species or 3.12% as rare or threatened species. Five species belong to the class of very rare (RR): *Daucus carota* subsp. *carota*, *Dittrichia graveolens*, *Polypodium vulgare*, *Stachys circinata* subsp. *zaiana* and *Valerianella dentata*. Five are rare (R): *Fumaria ouezzanensis* subsp. *ouezzanensis*, *Genista clavata*, *Glinus lotoides*, *Silene ibosii* and *Teucrium barbarum*. Suspected rare (R?) is the status of two species which are: *Astragalus depressus* and *Elaeoselinum meoides*. It should be noted that the botanical families to which the twelve species belong are Lamiaceae, Apiaceae and Fabaceae with two taxa each. A taxon is the representativeness of Asteraceae, Caryophyllaceae, Molluginaceae, Papaveraceae, Polypodiaceae and Valerianaceae. For heritage and historical reasons and to avoid their extinction, these species have a high conservation value.

Assessment of the risk of species extinction

The analysis of the results grouped in Table 1. revealed seven categories which are largely dominated by non-threatened taxa (LC) 90.36%. By far the taxa attached to the threatened categories (1.82%) are divided between one taxon in critical danger of extinction (CR), two taxa in danger (EN) and four taxa vulnerable (VU).

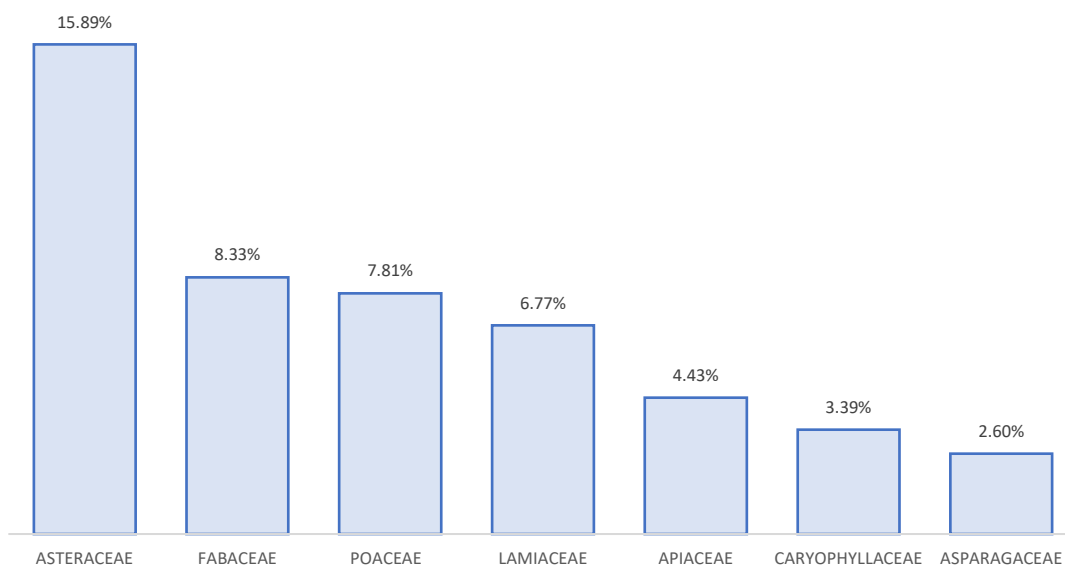


Figure 3. Contribution of Families with at least 10 species recorded in the flora of Ouezzane region (Prerif, North Atlantic Morocco-1)

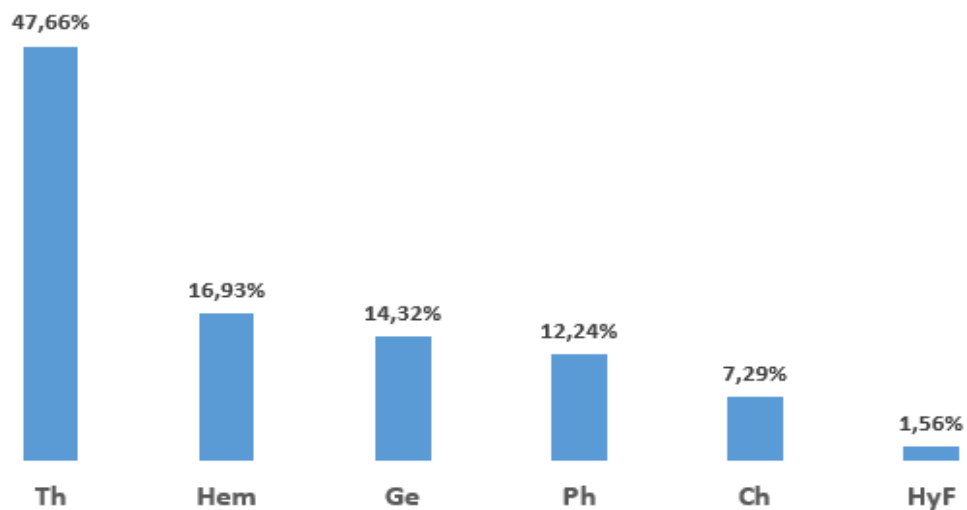


Figure 4. Life Forms of Spontaneous Species recorded in the flora of Ouezzane region (Prerif, North Atlantic Morocco-1).

Table 1. Number of threatened species categories and their percentage recorded in the flora of the Ouezzane region (Prerif, North Atlantic Morocco-1). CR: Critically endangered; EN: Endangered; DD: Data Deficient; LC: Least Concern (low risk of extinction); NA: Not applicable; NT: Near Threatened; VU: Vulnerable.

Category	Number of taxa	%
LC	347	90.36
NT	14	3.65
NA	10	2.60
DD	6	1.5V
CR	1	0.26
EN	2	0.52
VU	4	1.04

DISCUSSION

The flora inventory has identified 384 species distributed among 270 genera and 80 families. At the provincial level, this floristic richness obtained is high compared to the results of other similar studies carried out in the Izarene massif (Orch *et al.*, 2013). Indeed, despite the small area sampled (1390 ha), the floristic richness is greater than that found in the Izarene massif on horseback in our area.

The latter covering an area of 14600 ha have found favorable habitats for 275 species distributed between 63 families and 187 genera. Because the two areas are subject to the same climatic, edaphic and ecological conditions, this high number of species would be partly due to the three main elements. The first is that the combination of three different sampling methods increased the chance of encountering the maximum number of species. The second lies in the fact that the repetitive descents to the fields at different times of the year made it possible to meet the different phases of the life cycle (Vegetative stage and stage of flowering and fruiting); consequently, minimizing any risk of omission or confusion, especially for species with low abundance, fleeting appearance or closer morphologically. Finally, the geomorphological diversity of the inventoried natural environments (Summits, high slopes, mid-slope, lowlands, rocks, beds of Oued and plain) combined with the research efforts made allowed us to further enrich the list global.

Nevertheless, this floristic richness remains lower than that observed by the results of other work carried out in other regions. Indeed, in the Moulay Driss Zerhoun region, Boudik *et al.* (2021) inventoried 407 taxa divided into 257 genera and 67 families; in the Ben Slimane region, Tahri *et al.* (2011) identified 450 taxa distributed over 257 genera and belonging to 66 families. The large area over which these studies were carried out is one of the explanations that could justify this discrepancy in floristic richness. According to Fuentes-Montemayer *et al.* (2013), the fragmentation of natural habitats is most often associated with a significant loss of floristic diversity.

The distribution of the four systematic groups according to the number of species agrees with that obtained by Orch *et al.* (2013) in the Izarene massif. The four systemic groups have identified themselves in the said massif and with the same overall pattern of representativeness. Thus, its overall composition, in order of importance, is distributed between Dicotyledonous Angiosperms, Monocotyledonous

Angiosperms, Pteridophytes and finally Gymnosperms.

The first three families best represented in the number of species are Asteraceae with 61 species, or 15.89%, Fabaceae with 32 species, or 8.33% and Poaceae with 30 species, or 7.81%. This order is the same as that observed for all Moroccan vascular flora (Fennane & IbnTattou, 2012). However, this order is different from that recorded in the Ajdir-Itzer-Boumia-Midelt region (Hachi & Rahou, 2021) where Fabaceae, Caryophyllaceae and Asteraceae are the first three families respectively. The study by Hammada *et al.* (2011) in the coastal dunes of Oued El Malah (Martil) and lower Tahaddart proved that the first dominant families are Poaceae, Asteraceae and Fabaceae. The families Lamiaceae (26 species, 6.63%), Apiaceae (17 species, 4.34%), Caryophyllaceae (15 species, 3.83%), and Brassicaceae (11 species, 2.81%) are also well represented.

Despite the small surface area of the study area compared to other regions, the large number of species recorded is significant. This richness could be explained by: the geographical position of the study area which constitutes a transition zone between the plain of Ghareb and the Prerifain domain; the altitudinal gradient which goes from 55 m at the edge of Oued Loukkos to 628 m at the highest point of Jebel Moulay Abdeslam Rebeta to create the heterogeneity of the habitats; the study area is the western extension of the Izarene massif (mother forest); some parts of the prospected fragments have not yet undergone strong anthropization. The less the environment is anthropized, the more diversified it is (Kouassi *et al.*, 2015).

It is important to report for the first time the presence of four taxa: *Crepis vesicaria* subsp. *stellata* and *Scorzonera hispanica* L. subsp. *hispanica* (Asteraceae), *Juniperus oxycedrus* subsp. *oxycedrus* (Cupressaceae), *Quercus coccifera* and in our study region and by extension in the phytogeographic division Maroc Atlantique Nord-1 (Man-1). However, Fennane *et al.* (1999), indicated in their work that the distribution of *Juniperus oxycedrus* subsp. *oxycedrus* remains to be specified throughout Morocco. Confirmation of a five species: *Glinus lotoides* (Molluginaceae) was carried out in Man-1, while Fennane *et al.* (1999) indicated its presence in Man-2 and more precisely in Oued Fouarate; Maâmora and Âin Sferjla.

Certainly, this discovery will further enrich the vascular flora of spontaneous origin, better understand the distribution area of these species and

update the biographical references. In this sense, Boudik *et al.* (2024) in the Moulay massif Driss Zerhoun added 16 taxa to Man. Therefore, these results agree with the prediction of Fennane and Ibn Tattou (2012), Fennane *et al.* (2023) and Chambouleyron *et al.* (2015). According to this, and to clarify the distribution of certain poorly known taxa in the Man, the floristic re-examination of the Man is requested.

By comparing the life forms composition with other studies, we note that Benkhiguel *et al.* (2022) reported a finding close to ours. Boudick *et al.* (2024) also found that therophytes and hemicryptophytes lead with 49% and 16% respectively. According to Daget (1980) and Madon and Médail (1996), the richness in therophytes is a characteristic of Mediterranean and arid regions where strong water stress dominates. Within the Dicotyledonous Angiosperms, more than half of the life forms are therophytes. By far, followed respectively by the hemicryptophytes (16.72%), the phanerophytes (13.44%), the chamaephytes (8.85%), the geophytes (6.56%) and lastly the fixed hydrophytes by 0.66%. Several justifications could be at the origin of this dominance. The suitability of the climatic and edaphic conditions of the region, the degradation of the natural environment, the extension of food crops and the succession of years of drought are all factors favoring the dissemination of the grains of species that pass the bad weather in the grain condition. The flora of the region reveals an unequal distribution between life forms within the monocotyledonous Angiosperms. Indeed, the geophytes are the most frequent with 44.44% while the quarter is the portion of therophytes.

For the record, 978 taxa are the total Moroccan endemic taxa composed of 665 species and 313 subspecies (El Oualidi *et al.*, 2012). The number of strict endemics is equal to 920 taxa including 640 species and 280 subspecies, or 20.44% of the national vascular flora. Considering the taxa shared with neighboring territories: Iberian Peninsula, Algeria, Mauritania and Macaronesia, this number rises to 1559 (1247 species and 471 subspecies) (Fennane & Ibn Tatou, 2012).

The rate of endemism in our region (6.51%) is much lower than that of the national flora as well as that recorded in the Tazekka massif (8.8%) (Fougrach *et al.*, 2007). The low altitude of the study area whose amplitude is 573 m could be one of the main causes of this low rate of endemism. This reality was proven

by the study conducted by Alaoui *et al.* (2009) in wet high mountain grasslands, in this case at the sites of Ait Mizane, Oukaimeden and Tichka. With an altitude that goes from 2600 m to 3000 m the rate of endemism is 30.3%. Quézel (1995, 1999) emphasized the role of high mountains in the process of local progressive speciation. Bammi and Douira in 2004 in a study conducted in the Achach forest, central plateau (Morocco) found an endemism rate of around 5.57%. Beyond our borders, Hamel *et al.* (2013) found a rate of 6.09% while Aouadi *et al.* (2020) reported a higher rate of endemism than ours 7.26%.

Regarding the distribution of the 384 species of flora according to the different categories of the Red List, our results have the same broad features as those found by Boudik *et al.* (2024) with the recording of a slight difference in the percentage of 7 categories.

The presence of species with special status is solid proof of the floristic originality of this region. These species are more sensitive to any disturbance of their habitat related to human activities or climatic constraints. As a result, they deserve more than ever rigorous protection based on hastily applied measures, without which they would fade.

During our study we found that among the species encountered during the descent of the field, some are endangered or on borrowed time, and others have already disappeared. After having occupied low hills, currently the endemic species *Genista clavata* only survives in a few populations in restricted places. Used as a source of firewood and its twigs are in great demand for making brooms, this species faces a bleak future. To rule out any presumed danger of extinction in the future, this special-status taxon deserves more attention. The taking of additional safeguard measures and the preservation of its refuge environment are necessary. Thanks to their living environments that are difficult to access or even inaccessible (rocks, steep slopes) some of the species are still perpetuated; *Polypodium vulgare* and *Ruscus hypophyllum* are the cases. Some aromatic and medicinal plants, under overexploitation and excessive picking, only persist in smaller areas than before. Such is the case of *Origanum compactum* which is only one example among many others. Due to its multiple medicinal virtues, this species is in great demand, which constitutes a real threat to its existence. *Centaurium erythraea* is not spared from such a situation. The excessive collection to which it is exposed can lead to its scarcity. The preferential habitat of *Corrigiola telephiifolia* is nibbled away from

year to year and in conjunction with the removal of its main organ of perenniality, the root, its situation is worrying.

The field surveys carried out show that unfortunately, anthropogenic activities coupled with increasingly restrictive climatic conditions have led to a regression of the surface of the plant cortège. As a result, at present its rigorous protection and conservation are needed more acutely than ever to maintain local plant biodiversity in the long term. Fortunately, the launch of reforestation campaigns based on *Pinus halepensis* by the provincial directorate of Waters and Forests of Ouezzane has partly slowed down human activities.

CONCLUSION

Because the study area is the western gateway to the great Izarene massif, its geographical continuity represents the first beginnings of the Rif Mountain range, and it is home to a rich and diversified flora. Thus, 384 species belonging to 270 genera and distributed among 80 families have been identified. The best families represented in terms of the number of species are, in order of importance, Asteraceae, Fabaceae, Poaceae, Lamiaceae, and Apiaceae. *Plantago* is the best-represented genus by six taxa. Therophytes dominate the life forms with 47.66%. The originality and diversity of the flora have been highlighted by the presence of dozens of species with a special status. Thus, 25 species belong to six categories of endemism, and 12 species are defined as rare or threatened.

The inventory makes it possible to situate the flora of this area in relation to other regions and improve floristic knowledge, particularly in the Prerif. This study provides a solid base for more detailed knowledge that should be extended to other regions. Additionally, further studies must be conducted in the study area, such as mapping rare and threatened endemic species, studying the phytosociology of vegetation, the phytochemistry of species of therapeutic interest, and areal richness, and updating the list of species identified by herbalization campaigns spread over time and space.

ACKNOWLEDGEMENTS

The authors would like to thank the local authorities for having granted us all the facilities to carry out our work, to Mr. Hachimi Alaoui Sidi Mohamed, head of the Center for the Conservation and Development of Forest Resources of Ouezzane-ANEF for his help, his availability and sharing of information. Our gratitude

goes to the connoisseurs of the region especially Mr. El Benani Mohamed for their guidance and support in the field.

REFERENCES

- Adou Yao CY, Blom EC, Dengueadhé KTS, Van Rompaey RSAR, N'Guessan EK, Wittebolle G, and Bongers F (2005) Diversité Floristique et Végétation dans le Parc National de Tai, Côte d'Ivoire. *Tropenbos International et Ecosyn*. 104 pp.
- Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie, Direction de la Cartographie (2022) Carte topographique d'Ouezzane au 1/100 000, Ministère de l'Agriculture, de la Pêche Maritime, du Développement Rural et des Eaux et Forêts. Rabat, Maroc.
- Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie, Direction de la Cartographie (2022) Carte topographique de Brikcha au 1/25 000, Ministère de l'Agriculture, de la Pêche Maritime, du Développement Rural et des Eaux et Forêts. Rabat, Maroc.
- Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie, Direction de la Cartographie (2022) Carte topographique de Masmouda au 1/25 000, Ministère de l'Agriculture, de la Pêche Maritime, du Développement Rural et des Eaux et Forêts. Rabat, Maroc.
- Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie, Direction de la Cartographie (2022) Carte topographique Rhouna au 1/25 000, Ministère de l'Agriculture, de la Pêche Maritime, du Développement Rural et des Eaux et Forêts. Rabat, Maroc.
- Alaoui Haronis S, Alifriqui M, and Ouhammou A (2009) La diversité floristique des pelouses humides d'altitude: Cas des quelques sites du Haut Atlas Marocain. *Acta Botanica Malacinata* 34: 91-106.
<https://doi.org/10.24310/abm.v34i0.3147>
- Aouadj SA, Nasrallah Y, Hasnaoui O, and Khatir H (2020) La flore rare, endémique et menacée des Monts de Saida (Algérie). *AgroBiologia* 10(1): 1986-1998.
- Bammi J, and Douira A (2004) Contribution à la connaissance de la flore vasculaire de la forêt de l'Achach, Plateau central (Maroc). *Acta Botanica Malacitana* 29: 23-41.
<https://doi.org/10.24310/abm.v29i0.7220>
- Bellakhdar J (1997) La pharmacopée marocaine traditionnelle Médecine arabe ancienne et savoirs populaires. Ibis Press, Paris, 766pp.
- Benabid A (2000) Flore et écosystèmes du Maroc Évaluation et préservation de la biodiversité. Ibis Press. Paris, Librairie et éd. Kalila Wa Dimna, Rabat. 360pp.
- Benkhniq O, Chaachouay N, Khamar H, El Azzouzi F, Douira A, and Zidane L (2022) Ethnobotanical and ethnopharmacological study of medicinal plants used in the treatment of anemia in the region of Haouz-

- Rehamna (Morocco). *Journal of Pharmacy & Pharmacognosy Research* 10(2): 279-302.
https://doi.org/10.56499/jppres21.1196_10.2.279
- Benkhnigue O, Chaachouay N, and Zidane L (2023) A Floristical and Ecological Study of the Medicinal Flora Used by the Local Population of the Haouz-Rehamna Region (Middle Atlantic Morocco-4). *Acta Botanica Hungarica* 65(3-4): 247-304.
<https://doi.org/10.1556/034.65.2023.3-4.3>
- Boudik S, Khamar H, Magri N, Belahbib N, Zidane L, Benkhnigue O, and Dahmani J (2023) Study of the floristic diversity of the Moulay Driss Zerhoun region in the Prerif Range, Morocco. *Egyptian Journal of Botany* 63(3): 1-37.
<https://doi.org/10.21608/ejbo.2023.176949.2202>
- Centre d'investissement Tétouan (2016) Monographie de la province de Ouezzane, Royaume du Maroc Ministère de l'Intérieur. Tétouan, Maroc. 96pp.
- Centre de Travaux Agricoles commune territoriale d'Asjen (2014) Monographie de la Commune territoriale Asjen. Asjen. 214pp.
- Chambouleyron M, Bidat M, IbnTattou M, Molero J, Montserrat JM, Pyke S, and Léger JF (2015) Contribution à la connaissance de la flore vasculaire du Maroc oriental : plaine de Lamrija et revers nord des monts de Debdou. *Bull. Inst. Sci. Rabat. Section Sciences de la Vie* 37: 1-16.
- Daget P (1980) Sur les types biologiques botaniques en tant que stratégie adaptative (cas des thérophytes). Pp89-114. In R. Barbault, P. Blandin & J.A. Meyer (ed.), *Recherches d'écologie théorique. Les stratégies adaptatives*. Maloine, Paris.
- El Oualidi J, Khamar H, Fennane M, Ibn Tattou M, Chauvet S, and Taleb MS (2012) Checklist des endémiques et spécimens types de la flore vasculaire de l'Afrique du Nord. *Documents Inst. Sci.* 25: 193pp.
- Fennane M, and Ibn Tattou M (1998) Catalogue des plantes vasculaires rares, menacées ou endémiques du Maroc. *Bocconea* 8: 1-243.
- Fennane M, and Ibn Tattou M (1999) Observations sur la flore vasculaire endémique, rare ou menacée du Maroc. *Flora Mediterranea* 9(1): 13-124.
- Fennane M, Ibn Tattou M, Ouyahya A, and El Oualidi J (1999) Flore pratique du Maroc. Vol. 1. *Trav. Inst. Sci. Rabat, Sér. Bot.* N° 36. 558pp.
- Fennane M (2004) Propositions de Zones Importantes Pour les Plantes au Maroc. *Inst. Sci. Rabat.* 25pp.
- Fennane M, and Ibn Tattou M (2005) Flore vasculaire du Maroc Inventaire et Chorologie. vol. 1. *Inst. Sci. Rabat. Sér. Bot.* N°37. 483pp.
- Fennane M, Ibn Tattou M, Ouyahya A, and El Oualidi J (2007) Flore pratique du Maroc. Vol. 2. *Trav. Inst. Sci., Rabat. Sér. Bot.* N°38. 636pp.
- Fennane M, and Ibn Tattou M (2008) Flore vasculaire du Maroc Inventaire et Chorologie. vol. 2. *Inst. Sci. Rabat. Sér. Bot.* N°39. 398pp.
- Fennane M, and Ibn Tattou M (2012) Statistiques et commentaires sur l'inventaire actuel de la flore vasculaire du Maroc. *Bull. Inst. Sci., Section Sciences de la vie, N°31(1):* 1-9.
- Fennane M, Ibn Tattou M, Ouyahya A, and El Oualidi J (2014) Flore pratique du Maroc. Vol. 3. *Trav. Inst. Sci. Rabat. Sér. Bot.* N°40. 793pp.
- Fennane M (2021) Livre Rouge de la Flore Vasculaire du Maroc. *Trav. Insti. Sci., Sér. Bot., N spécial, Premier centenaire de l'Institut Scientifique, Rabat.* 749pp.
- Fennane, M, Tattou, MI, El Oualidi J, Taleb MS, Benkhnigue O, Khamar H, and Moujahdi C (2023) Floristic research in Morocco: achievements and future trends. *Fl. Medit.* 33: 5-16.
<https://doi.org/10.7320/FIMedit33.005>
- Fougrach H, Badri W, and Malki M (2007) Flore vasculaire rare et menacée du massif de Tazekka (Région de Taza, Maroc). *Bull. Insti. Sci., Rabat, section Sciences de la Vie, N°29 :* 1-10.
- Fuentes-Montemator E, Goulson D, Cavin L, Wallace JM, and Park KJ (2013) Fragmented woodlands in agricultural landscapes: The influence of woodland character and landscape context on bats and their insect prey. *Agriculture, Ecosystems & Environment* 172: 6-15.
<https://doi.org/10.1016/j.agee.2013.03.019>
- Ghhoré E, Koné M, Soro Y, N'Guessan YJ, and Bakayoko A (2020) Effets de l'anthropisation sur la diversité floristique à la périphérie du Parc National du Banco, Abidjan, Côte d'Ivoire. *Afrique Science* 16(4): 167-180.
- Gnahore E, Missa K, and Bakayoko A (2018) Dynamique et structure de la flore de la Savane Protégée des Feux dans la Réserve Scientifique de Lamto (Centre de la Côte d'Ivoire). *European Scientific Journal* 36: 432-451.
<http://dx.doi.org/10.19044/esj.2018.v14n36p432>
- Godron M (1971) Essai sur une approche probabiliste de l'écologie des végétations. Thèse Doct. D'Etat, U.S.T.L., Montpellier, France. 247pp.
- Godron M, and Daget P (1982) Analyse fréquentielle de l'écologie des espèces. *Ecologia mediterranea*, t. 8, n°4: 206pp.
- Gounot M (1971) Méthode d'étude quantitative de la végétation. *Annales de Géographie*, t. 80, n°441: 591-592.
- Guelou N, Ouattara ND, Konan D, Gnahore E, Missa K, and Bakayoko A (2018) Diversité floristique de la forêt galerie du Bandama dans la réserve scientifique de Lamto en côte d'Ivoire. *Afrique Science* 14(4) : 439-452.
- Hachi M, and Rahou A (2021) Contribution à une étude de « Ajdir-Itzer-Boumia-Midelt » (moyen Atlas, Maroc). *International journal of Development Research* 11(04): 46274-46282.
- Hamel T, Seridi R, De Belair G, Slimani A, and Babali B (2013) Flore vasculaire rare et endémique de la péninsule de l'Edough (Nord-Est Algerien). *Rev. Sci. Technol., Synthèse* 26: 65-74.
- Hammada S, Linares L, and Cortes J (2011) Biodiversité floristique des dunes littorales de l'Oued El Maleh (Martil) et du bas Tahaddart: résultats préliminaires. *Bull. Insti. Sci., Rabat, N°6:* 45-50.

- Kouassi KE, Sangne YC, and Koussi KH (2015) Richesse et diversité floristique dans les biotopes environnants la forêt Classé de la Téné dans le département d'Oumé en Côte d'Ivoire. *Journal of Animal & Plant Sciences* 24 (1): 3700-3713.
- Madon O, and Médail F (1996) The ecological significance of annuals on a Mediterranean grassland (Mt Ventoux, France). *Plant Ecol.* 129: 189-199.
<https://doi.org/10.1023/A:1009759730000>
- Orch H, Zidane L, and Douira A (2013) Contribution à la connaissance de la Flore vasculaire du massif d'Izarène (Nord-Ouest Maroc). *Journal of Animal & Plant Sciences* 20(2): 3093-3112.
- Orch H, Douira A, and Zidane L (2014) Étude ethnobotanique des plantes médicinales utilisées dans le traitement du diabète, et des maladies cardiaques dans la région d'Izarène (Nord du Maroc). *Journal of Applied Biosciences* 86: 7940–7956.
<https://doi.org/10.4314/jab.v86i1.3>
- Orch H, Chaachouay N, Faiz N, Douiri E, Zidane L, and Douira A (2021) Use of medicinal plants in dermatocosmetology: An ethnobotanical study among the population of Izarène. *Jordan Journal of Pharmaceutical Sciences* 14(3): 323-340.
- Quézel P (1995) La flore du bassin méditerranéen : origine, mise en place, endémisme-C. R. Congr. Intern. Conservation des flores dans les îles méditerranéennes Ajaccio. *Ecologia Mediterranea* N°spécial: 19-39.
- Quézel P (1999) Les grandes structures de végétation en région méditerranéenne : facteurs déterminants dans leur mise en place post-glaciaire. *Geobios* 32(1): 19-32.
[https://doi.org/10.1016/S0016-6995\(99\)80081-3](https://doi.org/10.1016/S0016-6995(99)80081-3)
- Sauvage C (1959) Animaux et végétaux rares de la région méditerranéenne. *La Terre et la Vie* Suppl. : 156-158.
- Soro Y, Ouattara ND, Missa K, and Bakayoko A (2019) Analyse de la diversité floristique de quelques îles Aménagées du barrage de Buyo (cote d'ivoire). *European Scientific Journal* 15(18): 165-182.
<http://dx.doi.org/10.19044/esj.2019.v15n18p165>
- Sutter G, and Fiecher GG (1966) Le Rif méridional atlantique (Maroc): aperçu structural sur la région de Zoumi-Ouezzane et le pays de Habt (Larache). Notes Mém. Serv. Géol. Rabat. 26: 15–20
- Tahri N, Zidane L, El Yacoubi H, Fadli M, and Rochdi A (2011) Contribution à l'étude de la biodiversité de la région de Ben Slimane (Ouest marocain): Catalogue floristique des plantes vasculaires. *Journal of Animal & Plant Sciences* 12: 1632-1674.

Appendix

Floristic list; Life forms spectrum; Bioclimatic stage; Flowering period; Assessment criteria; Rarity and endemism and Geographic distribution in Morocco of flora of the Ouezzane region (Prerif, North Atlantic Morocco-1). Abbreviations: Life form spectrum: Ph: Phanerophyte; Ch: Chamaephyte; Hem: Hemicryptophyte; G: Geophyte; Th: Therophyte; Hyd: Fixed hydrophyte. Bioclimatic stage: S: Saharan; A: Arid; SA: Semi-arid; H: Humid; SH: Subhumid; HM: High Mountain. Flowering period: F: Fall; W: Winter; S: Spring; Su: Summer. Assessment Criteria: CR: Critically endangered; DD: Data Deficient; EN: Endangered; LC: Least Concern (low risk of extinction); NA: Not applicable; NT: Near Threatened; VU: Vulnerable. Distribution in the geographical divisions of Morocco: Ms: Morocco Saharan; As: Saharan Atlas; AA: Anti Atlas; HA: High Atlas; MA: Middle Atlas; Mam: Middle Atlantic Morocco; Man: North Atlantic Morocco; Op: Eastern Morocco plateau; Om: Mountains of eastern Morocco; LM: Mediterranean coastline; R: Rif. Endemism: E: endemic to Morocco; EI: endemic to Morocco and the Iberian Peninsula; EA: Endemic to Morocco and Algeria; EIA: Endemic to Morocco Algeria and the Iberian Peninsula; EIC: Endemic to Morocco, the Iberian Peninsula and the Canaries; EIAC?: Suspected. Rarty: R: Rare; RR: Very rare; R?: Suspected rare.

Divisions, Families and Species	Life from spectrum	Bioclimatic stage	Flowering period	Assessment criteria	Endemism / Rarity	Geographic distribution in Morocco
I-PTERIDOPHYTES						
ADIANTACEAE						
<i>Anogramma leptophylla</i> L. Link.	Th	(A), SA, SH, H	W, S	LC		AA, HA, MA, Mam, Man, Om, LM, R
ASPLENIACEAE						
<i>Asplenium ceterach</i> L. subsp. <i>ceterach</i>	G	A, SA, SH, H	W, S, Su, F	LC		As, AA, HA, MA, Mam, Man, Om, LM, R
EQUISETACEAE						
<i>Equisetum telmateia</i> Ehrh.	G	SH, H	W, S	LC		Man (Zaine, El Harcha), R (Chaouène)
POLYPODIACEAE						
<i>Polypodium vulgare</i> L.	G	SA, SH, H, HM	W, S, (Su)	CR	RR	HA, MA, Man, LM, R
SELAGINELLACEAE						
<i>Selaginella denticulata</i> (L.) Spring	Hem	SA, SH, H	W, S	LC		HA, MA, Mam, Man, Om, LM, R
II- GYMNOSPERMS						
CUPRESSACEAE						
<i>Juniperus oxycedrus</i> L. subsp. <i>oxycedrus</i>	Ph	SA, SH, H	W, S	LC		Man1 (Ouezzane)
PINACEAE						
<i>Pinus halepensis</i> Miller.	Ph	SA, SH	S	LC		As, HA, MA, Om, R
III- MONOCOTYLEDONOUS ANGIOSPERMS						
ALISMATACEAE						
<i>Alisma lanceolatum</i> With.	HyF	A, SA, SH, H	(W), S, Su, (F)	LC		HA, MA, Mam, Man, LM?, R
ALLIACEAE						
<i>Allium chamaemoly</i> L.	G	SA, SH	F, W, S	LC		MA, Mam (Nouacer), Man, Op (Midelt), LM, R
<i>Allium guttatum</i> Steven subsp. <i>Sardoum</i> (Moris) Stearn	G	SA, SH	S	VU		HA Oriental (Plateau of the lakes), HA/Op (between midelt & ansegrim), MA (Ifrane), Mam (S of casablanca), Man, Om (Bni snassène), LM (Gherb; Mmelilia region), R (J. Tazaot)
<i>Allium pallens</i> L.	G	A, SA, SH, HM		LC		As, AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Allium triquetrum</i> L.	G	SA, SH	W, S	LC		Man, LM, R
AMARYLLIDACEAE						
<i>Narcissus broussonetii</i> Lag.	G	SH	F, (W)	NT	E	HA?, Mam, Man
<i>Narcissus papyraceus</i> Ker Gawl.	G	SA, SH	W, S	LC		MA, Mam, Man, LM, R
<i>Narcissus serotinus</i> L.	G	A, SA, SH	F	DD		AA (Ait Baha, Tamegdoult), Mam, Man, LM?, R
ARACEAE						
<i>Arisarum vulgare</i> Targ. Tozz.	G	A, SA	W, S, (Su)	LC		All geographic divisions
<i>Arum italicum</i> Mill.	G	A, SA, SH, H	S, (Su)	LC		HA, MA, Man, Op, Om, LM, R
ARECACEAE						
<i>Chamaerops humilis</i> L.	Ch	A, SA, SH	S, (Su)	LC		AA, HA, MA, Mam, Man, Om, LM, R
ARISTOLOCHIACEAE						
<i>Aristolochia baetica</i> L.	Ph	SA, SH, H	W, S	LC	EIA	AA, HA, Man, Om, LM, R
<i>Aristolochia paucinervis</i> Pomel	G	SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Om, LM, R
ASPARAGACEAE						
<i>Asparagus albus</i> L.	Ph	A, SA, SH	Su, F	LC		AA (Tazeroualt; j. Kest), HA, MA, Mam, Man, Op, Om (Bni Snassène), LM, R
<i>Asparagus aphyllus</i> L. subsp. <i>aphyllus</i>	Ch	A, SA, SH	Su, F	LC		Mam (Haouz Rehamna), Man, Op, Western LM?, R
<i>Dipcadi serotinum</i> L. subsp. <i>serotinum</i>	G	A, SA, SH	F, W, S	LC		All geographic divisions
<i>Drimia maritima</i> (L.) Stearn.	G	A, SA, SH, H	Su, F, (W)	LC		All geographic divisions

<i>Hyacinthoides lingulata</i> (Poir.) Rothm.	G	SA, SH	F, (W)	LC	Mam (Chaouia- Doukkala), Man, Om (Bni Snassène), LM, R
<i>Muscari neglectum</i> Guss. ex Ten.	G	A, SA, SH	W, S, Su	LC	HA, MA, Mam, Man, Op, Om, LM, R
<i>Ornithogalum narbonense</i> L.	G	SA, SH, H	S, Su	LC	As, AA, HA, MA, Mam, Man, Op, Om (Bni Snassène), LM, R
<i>Ruscus aculeatus</i> L.	G	SA, SH, H	W, S	LC	As, AA, HA, MA, Mam, Man, Op?, Om, LM, R
<i>Ruscus hypophyllum</i> L.	G	SA, SH, H	W, S	LC	MA, Mam, Man, Om, LM, R
<i>Scilla peruviana</i> L.	G	A, SA, SH, H	S, Su	LC	AA, HA, MA, Mam, Man, Op, Om (Bni Snassène), LM, R
COLICHCACEAE					
<i>Colchicum lusitanum</i> Brot.	G	SA, SH, H	F	LC	HA, MA, Mam (Chaouia-Doukkala), Man, Om (Bni Snassène), LM?, R
CYPERACEAE					
<i>Cyperus longus</i> L.	HyF	A, SA, SH, H	S, Su, (F)	LC	Ms(sahara), As, AA (saghro), HA, MA, Mam, Man, Op, Om (bni snassène: oulad Salah), LM, R
<i>Cyperus rotundus</i> subsp. <i>rotundus</i> L.	G	SA, SH	(F), S, Su, W	LC	Ms (Sahara), HA (O. Dadès, assif Ighighi), Mam, Man, LM, R
<i>Eleocharis palustris</i> (L.) R. Br. subsp. <i>Palustris</i>	Hem	S, A, SA, SH, H	S, Su, (F)	LC	Oriental Ms, As, HA, MA, Mam, Man, Op, Western LM, R
<i>Schoenoplectus litoralis</i> (Schrad.) Palla	HyF	S, A, SA, SH	S, Su	LC	Ms (source of Meski, Assa, Agadir, Tissint, Gueltat O. Aâbar), Mam, Man, LM (Moulouya ; Ras El-Ma), R
<i>Scirpoides holoschoenus</i> (L.) Soják	Hem		(W), S, Su	LC	All geographic divisions
DIOSCOREACEAE					
<i>Dioscorea communis</i> (L.) Caddick & Wilkin.	G	(A), SA, SH, H	(W), S, (Su)	LC	AA (Ifni Mountains), HA, MA, Mam, Man, Om, LM?, R
IRIDACEAE					
<i>Gladiolus italicus</i> Mill.	G	A, SA, SH	S	LC	All geographic divisions
<i>Moraea sisyrinchium</i> (L.) Ker Gawl.	G	SA, SH	W, S	LC	AA, HA, Central MA, Mam, Man, Op, Om?, LM, R
JUNACEAE					
<i>Juncus acutus</i> L. subsp. <i>acutus</i>	Hem	S, A, SA, SH, H	S, Su	LC	Ms (Foum El-Oued W of Laâyoune; nearly 13 km N Lemsied), HA, MA, Mam, Man, Op, LM, R
<i>Juncus bufonius</i> L.	Th	S, A, SA, SH, H	S, Su	LC	All geographic divisions
ORCHIDACEAE					
<i>Barlia robertiana</i> (Loisel.) Greuter	G	A, SA, SH, H	S	DD	MA (Ifrane, Tazzeke), Mam, Man (Zerhoun ; Meknes), LM ?, R
<i>Ophrys apifera</i> Huds.	G	SA, SH, H	S, Su	LC	AA (Ait Taleb des Ammelh), HA, MA, Mam, Man, Om, LM, R
<i>Ophrys bombyliflora</i> Link.	G	SA, SH	S	LC	MA, Mam, Man, LM?, R
<i>Ophrys speculum</i> Link	G	SA, SH, H	S	LC	HA, MA, Mam, Man, Om?, LM, R
<i>Serapias parviflora</i> Parl.	G	SH, SA	S	LC	Mam, Man, LM?, R
POACEAE					
<i>Aegilops geniculata</i> Roth	Th	A, SA, SH, H	S, Su	LC	As, AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Aegilops triuncialis</i> L.	Th	A, SA, SH, H	S, Su	LC	AA, HA, MA, Mam, Man, Om?, LM, R
<i>Ampelodesmos mauritanicus</i> (Poir.) Durand & Schinz	Hem	SA, SH, H	S, (Su)	LC	MA, Man (Fez and Meknes region), Om (Bni Snassène), LM
<i>Arundo donax</i> L.	G	(A), SA, SH	Su, F, (W)	LC	All geographic divisions
<i>Avena barbata</i> Link subsp. <i>barbata</i>	Th	A, SA, SH	(W), S, (Su)	LC	Oriental Ms, As, AA, HA, MA, Mam, Man, Op, Om (Bni Snassène)?, LM, R
<i>Brachypodium phoenicoides</i> (L.) Roem & Schult.	Hem	SA, SH, H	S, Su	LC	AA (saghro), HA, MA, Man, LM, R
<i>Brachypodium sylvaticum</i> (Huds.) P. Beauv.	Hem	SH, H	S, (Su)	LC	HA, MA, Man, LM, R
<i>Briza maxima</i> L.	Th	SA, SH, H	S, Su	LC	HA, MA, Mam, Man, Om, LM, R
<i>Briza minor</i> L.	Th	A, SA, SH, H	(W), S, (Su)	LC	AA, HA, MA, Mam, Man, Om, LM, R
<i>Bromus hordeaceus</i> L.	Th	S, A, SA, SH, H	S, (Su)	LC	Ms (O. Aâbar in N of Abattih on Smara-Tantan road), AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Bromus lanceolatus</i> Roth subsp. <i>lanceolatus</i>	Th	S, A, SA, SH	S, (Su)	LC	Ms (around Laâyoune and elsewhere), AA (Lakhsass Plateau), HA, MA, Mam, Man, Op, Om, LM, R
<i>Cynodon dactylon</i> (L.) Pers.	G	S, A, SA, SH, H	Flowering possible all year	LC	All geographic divisions
<i>Cynosurus echinatus</i> L.	Th	SA, SH, H	S, Su	LC	MA, Man, Om (Bni Snassène), LM, R
<i>Dactylis glomerata</i> L. subsp. <i>Hackelii</i> (Asch & Graeb.) Cif. & Giacom	Th	(A), SA, SH, H, (HM)	S, Su	LC	AA, Mam (Chaouia-Doukkala), Man

<i>Gastridium ventricosum</i> (Gouan) Schinz & Thell.	Th	A, SA, SH, H	S, (Su)	LC		Ms (O. Noun to Sidi Aroussi, 20 km W of Abouda), AA, HA, Mam, Man, Om, LM, R
<i>Gaudinia fragilis</i> (L.) P. Beauv.	Th	A, SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Hordeum bulbosum</i> L.	Hem	SA, SH, H	S, (Su)	LC		Ms (Sahara)?, HA, MA, Man, western LM ?, R
<i>Hordeum murinum</i> L.	Th	S, A, SA, SH, H	(W), S, Su	LC		All geographic divisions
<i>Hyparrhenia hirta</i> (L.) Stapf	Hem	S, A, SA, SH	S, Su, F	LC		Ms (lower valley of the western Draâ)?, MA (around Taza, 930 m), Mam (Marrakech)?, Man, LM, R
<i>Lamarckia aurea</i> (L.) Moench	Th	A, SA, SH	S, Su	LC		All geographic divisions
<i>Lolium multiflorum</i> Lam.	Th	SA, SH	S, Su	LC		Ms, HA, MA, Mam, Man, Om (Bni Snassène), LM, R
<i>Lolium perenne</i> L.	Hem	SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Lolium temulentum</i> L.	Th	SA, SH, H	S, Su	LC		HA, MA, Man, Op (banks of the Moulouya), LM, R
<i>Melica magnolii</i> Gren. & Godr.	Hem	A, SA, SH	S, Su	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Phalaris canariensis</i> L.	Th	SA, SH	S, (Su)	NA		Mam, Man, Western LM, R
<i>Phragmites australis</i> (Cav.) Steud.	G	S, A, SA, SH, H	Su, (F)	LC		All geographic divisions
<i>Piptatherum miliaceum</i> (L.) Coss.	Hem	A, SA, SH, H	S, Su, F	LC		All geographic divisions
<i>Poa trivialis</i> L.	Hem	A, SA, SH, H	S, (Su)	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Polypogon monspeliensis</i> (L.) Desf.	Th	S, A, SA, SH	(W), S, (Su)	LC		All geographic divisions
<i>Polypogon viridis</i> (Gouan) Breister. subsp. <i>pauciflorus</i> H. Scholz & R. Otto	Hem	S, A, SA, SH	S, Su, F	LC		All geographic divisions
SMILACEAE						
<i>Smilax aspera</i> L.	Ph	SA, SH, H	Su, (F)	LC		As, AA, HA, MA, Mam, Man, Om, LM, R
TYPHACEAE						
<i>Typha angustifolia</i> L.	HyF	SA, SH, H	S, Su	LC		HA (O. Tifenout), MA (dayet Aoua ; o.Tizguite ; Ouzoud waterfalls), Mam, Man, Om(Bni Snassène), LM ?, R
XANTHORRHOEACEAE						
<i>Asphodelus ramosus</i> L. subsp. <i>ramosus</i>	G	A, SA, SH, H	(F), S, Su	LC		All geographic divisions
IV- DICOTYLEDONOUS ANGIOSPERMS						
ACANTHACEAE						
<i>Acanthus mollis</i> L. subsp. <i>platyphyllus</i> Murb.	Hem	SA, SH, H	S, Su	LC		MA, Man, Om, LM, R
ADOXACEAE						
<i>Viburnum tinus</i> L. subsp. <i>tinus</i>	Ph	SA, SH, (H)	S	LC		HA, MA, Man, Om (Bni Snassène), LM, R
AMARANTHACEAE						
<i>Atriplex prostrata</i> R. Br.	Th	A, SA, SH	(S), Su	LC		Mam, Man, Op, LM, R
<i>Beta maritima</i> L.	Th	A, SA, SH	S	LC		All geographic divisions except the Saharan regions
<i>Chenopodium album</i> L.	Th	S, A, SA, SH, H	S, Su, F	LC		Ms, AA, HA, MA, Mam, Man, Op, R
<i>Chenopodium murale</i> L.	Th	S, A, SA, SH	W, S, Su	LC		All geographic divisions
ANACARDIACEAE						
<i>Pistacia atlantica</i> Desf.	Ph	A, SA, SH	S, Su	LC		All geographic divisions
<i>Pistacia lentiscus</i> L.	Ph	SA, SH, H	S	LC		As, AA, HA, MA, Mam, Man, Om, LM, R
APIACEAE						
<i>Ammi majus</i> L.	Th	SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Ammi visnaga</i> (L.) Lam.	Th	(A), SA, SH, H	S, Su	LC		All geographic divisions
<i>Apium nodiflorum</i> (L.) Lag.	HyF	S, A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Bupleurum lancifolium</i> Hornem	Th	A, SA, SH, H	S	LC		Ms (W Laayoune), As (W Iche), HA, MA, Mam, Man, Op, Om, LM, R
<i>Cachrys sicula</i> L.	G	SA, SH, H	S, Su	LC		MA, Man, LM (Bokkoya), R
<i>Conium maculatum</i> L.	Th	A, SA, SH, H	S	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Daucus carota</i> L. subsp. <i>carota</i>	Th	A SA, SH, H	S, Su	LC	RR	HA?, MA, Mam, Man, Om, LM, R
<i>Daucus crinitus</i> Desf.	G	A, SA, SH, H	S, Su	LC		AA, Western HA, MA, Mam, Man, Om, LM, R
<i>Elaeoselinum meoides</i> (Desf.) Koch ex DC.	G	SA, SH, H	S, Su	LC	R?	AA (Ifni mounts), HA (j. Ouaskal; Isk Rached), MA (Bab Azhar; between Ouauizaght and Taguelft), Mam (Souss; Derouate; Jbilète) LM, R
<i>Eryngium tricuspdatum</i> L.	Hem	A, SA, SH, H	Su	LC		Ms, AA, HA, MA, Mam, Man, Om, LM, R
<i>Kundmannia sicula</i> (L.) DC.	G	SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Om, LM, R

<i>Magydaris panacifolia</i> (Lam.) Paol.	G	SA, SH	S	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Ridolfia segetum</i> Moris	Th	A, SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Smyrnum olusatrum</i> L.	G	SA, SH, H	W, S	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Thapsia transtagana</i> Brot.	G	A, SA, SH, H	S	LC		Ms?, HA, MA, Mam, Man, Op, Om, LM, R
<i>Torilis arvensis</i> (Hudson) Link	Th	A, SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Torilis nodosa</i> (L.) Gaertner	Th	A, SA, SH, H	S	LC		All geographic divisions
APOCYNACEAE						
<i>Nerium oleander</i> L.	Ph	S, A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Vinca major</i> L.	Hem	SA, SH	S, Su	NA		HA, Man, R
ASTERACEAE						
<i>Anacyclus radiatus</i> Loisel. Subsp. <i>radiatus</i>	Th	A, SA, SH, H	(W), S, (Su)	LC		western Ms, HA, MA, Mam, Man, Op, Om, LM, R
<i>Andryala integrifolia</i> L.	Th	A, SA, SH, H	S, Su, (F)	LC		AA, HA, MA, Mam, Man, Op, LM, R
<i>Atractylis cancellata</i> L.	Th	S, A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Bellis annua</i> L.	Th	A, SA, SH, H	W, S, (Su)	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Bellis sylvestris</i> Cirillo	Hem	SA, SH, H	W, S, Su (F)	LC		AA, HA, MA, Mam, Man, Op (Lower Moulouya), Om, LM, R
<i>Calendula arvensis</i> (Vaill.) L.	Th	Redural plant	W, S, Su	LC		All geographic divisions
<i>Carlina gummifera</i> (L.) Less.	Hem	A, SA, SH	Su, F	LC		HA, MA, Mam, Man, Om, LM, R
<i>Carlina racemosa</i> L.	Th	A, SA, SH	S, Su, (F)	LC		HA, MA, Mam, Man, Om, LM, R
<i>Carthamus caeruleus</i> L.	Hem	A, SA, SH	S, Su	LC		AA (Kest), HA, MA, Mam, Man, Op, Om, LM, R
<i>Carthamus lanatus</i> L.	Th	A, SA, SH	S, Su	LC		As, AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Centaurea calcitrapa</i> L.	Th	A, SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Centaurea eriophora</i> L.	Th	A, SA	S, (Su)	LC		As, Central MA, Mam, Man, Op, Om, LM, R
<i>Centaurea melitensis</i> L.	Th	S, A, SA, SH	S, Su	LC		Oriental Ms, As, AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Centaurea pullata</i> L.	Hem	A, SA, SH, H	(W), S, (Su)	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Chamaemelum fuscatum</i> (Brot.) Vasc.	Th	A, SA, SH	(W), S, Su	LC		Ms, HA, MA, Mam, Man, Op, Om, LM, R
<i>Cichorium intybus</i> L.	Hem	SA, SH, H	S, Su	LC		HA, MA, Man, Op, Om, LM, R
<i>Cladanthus mixtus</i> (L.) Chevall.	Th	A, SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Coleostephus myconis</i> (L.) Rchb. f.	Th	A, SA, SH, H	(W), S, (Su)	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Crepis vesicaria</i> L. subsp. <i>stellata</i> (Ball) Bab.	Hem	A, SA, SH	W, S, Su	LC		AA (Kest, 800-1700 m) HA, Mam, Om (Taforhalt), R (Tanger). (n.v.)
<i>Crepis vesicaria</i> L. subsp. <i>taraxacifolia</i> (Thuill.) Thell.	Hem	A, SA, SH, H	W, S, Su	LC		Non-Saharan Morocco
<i>Cynara humilis</i> L.	G	SA, SH, H, HM	S, Su	LC	EIAC?	HA, MA, Mam, Man, LM western, R
<i>Dittrichia graveolens</i> (L.) Greuter	Th	A, SA	Su, F	LC	RR	Man, Op (Lower moulouya), Om (Bni Snassène), LM, R
<i>Dittrichia viscosa</i> (L.) Greuter	Ch	A, SA, SH, H	Su, F	LC		All geographic divisions (except Non-Saharan Morocco)
<i>Echinops spinosissimus</i> Turra	Hem	SA, SH, H	S, Su, (F)	LC		All geographic divisions
<i>Filago gallica</i> L.	Th	SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Op (lower Moulouya), Om, LM, R
<i>Filago pygmaea</i> L.	Th	A, SA, SH, H	(W), S, (Su)	LC		AA, HA, MA, Mam, Man, Op?, Om, LM, R
<i>Filago pyramidata</i> L.	Th	S, A, SA, SH, H	(W), S, (Su)	LC		Ms, AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Galactites tomentosus</i> Moench	Th	A, SA, SH	S, Su	LC		HA, MA, Mam, Man, Op, Om, LM
<i>Geropogon hybridus</i> (L.) Sch. Bip.	Th	A, SA, SH	S, Su	LC		Ms/AA (NW de Forum El-Hisn), HA, MA, Mam, Man, Op (Lower Moulouya), Om (Bni Snassène), LM, R
<i>Glebionis coronaria</i> (L.) Spach	Th	A, SA, SH, H	(W), S	LC		All geographic divisions
<i>Glebionis segetum</i> (L.) Fourr.	Th	A, SA, SH, H	(W), S	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Glossopappus macrotus</i> (Walp.) Briq. & Cavill	Th	A, SA, SH, H	(W), S, (Su)	LC		HA, MA, Mam, Man, Om, LM, R
<i>Hedypnois rhagadioloides</i> (L.) F. W. Schmidt	Th	A, SA, SH, H	(W), S, (Su)	LC		All geographic divisions
<i>Helminthotheca echioides</i> (L.) Holub	Th	A, SA, SH, H	S, Su	LC		Non-Saharan Morocco
<i>Hypochaeris achyrophorus</i> L.	Th	A, SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Hypochaeris radicata</i> L.	Hem	A, SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R

<i>Hyoseris radiata</i> L.	Hem	A, SA, SH, H	S, Su	LC		Non-Saharan Morocco
<i>Jacobaea erratica</i> (Bertol.) Fourr.	Hem	SA, SH	S	LC		Mam, Man, LM, R
<i>Lactuca serriola</i> L.	Th	S, A, SA, SH, H	Su, F	LC		Ms (Rissani), HA, MA, Mam, Man, Op, Om, LM, R
<i>Leontodon saxatilis</i> Lam.	Th	A, SA, SH, H	S, Su	LC		Western AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Leontodon tuberosus</i> L.	Hem	SA, SH, H	W, S	LC		HA, MA, Mam, Man, Om, LM, R
<i>Mauranthemum paludosum</i> (Poir.) Vogt et Oberper subsp. <i>paludosum</i>	Th	SA, SH	W, S	LC		MA, Man (Middle Prerif, Sabou; Zaiane), Om (Bni Snassène: Bni Khellouf Fouaga, Between Tizi-n-Tirchete and J. Farouane, 900m), LM, R
<i>Micropus supinus</i> L.	Th	A, SA, SH	(W), S, (Su)	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Otospermum glabrum</i> (Lag.) Willk.	Th	A, SA, SH	S, (Su)	LC		MA (Tazekka), Mam (Chaouia-Doukkala; Haouz), Man, Op, LM?, R
<i>Pallenis spinosa</i> (L.) Cass. subsp. <i>maroccana</i> (Aurich & Podlech) Greuter	Hem	A, SA, SH, H	(W), S, Su	LC	EA	AA, HA, MA, Mam, Man, Op (Lower Moulouya), Om, LM, R
<i>Pallenis spinosa</i> (L.) Cass subsp. <i>spinosa</i>	Hem	A, SA, SH, H	(W), S, Su	LC		Ms (Errachidia), Mam, Man, Op (Lower moulouya), Om (Bni Snassène), LM, R
<i>Phagnalon rupestre</i> (L.) DC.	Ch	A, SA, SH, H	S, Su	LC		Oceanic Ms (Hassi Zehar; ...?), HA, MA, Mam, Man, Op (lower Moulouya), Om, LM, R
<i>Picnoman acarna</i> (L.) Cass.	Th.	SA, SH, H	(S), Su	LC		HA, MA, Man (Middle Pre rif; Sebou), Om, LM, R
<i>Pulicaria odora</i> (L.) Rchb.	Hem	SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Om, LM, R
<i>Scolymus hispanicus</i> L.	Hem	S, A, SA, SH, H	S, Su	LC		Ms (Rissani), AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Scorzonera hispanica</i> L. subsp. <i>hispanica</i>	Hem	H	S	LC		Man-1
<i>Senecio glaucus</i> subsp. <i>coronopifolius</i> (Maire) C. Alexander	Th	S, A, SA, H	W, S, Su	LC		Ms, As, AA, HA, Mam, Op
<i>Senecio leucanthemifolius</i> Poiret	Th	S, A, SA, SH, H	(F), W, S, (Su)	LC		Ms, HA, MA, Mam, Man, Op, Om, LM, R
<i>Senecio vulgaris</i> L.	Th	A, SA, SH, H	Flowering possible all year	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Silybum marianum</i> (L.) Gaertn.	Th	A, SA, SH, H	S, Su	LC		Ms (SW of Guelmim), HA, MA, Mam, Man, Op, Om, LM, R
<i>Stachelina dubia</i> L.	Ch	SA, SH	S, Su	LC		HA, MA, Man (Zerhoun), Om, LM, R
<i>Tolpis barbata</i> (L.) Gaertn.	Th	SA, SH	S, Su	LC		Man, Op, Om, LM, R
<i>Urospermum dalechampii</i> (L.) F.W. Schmidt	Hem	SA, SH, H	S, Su	LC		HA, MA, Mam (Chaouia-Doukkala), Man, Op, Om, LM, R
<i>Urospermum picroides</i> (L.) F.W. Schmidt	Th	A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Xanthium orientale</i> L.	Th	A, SA, SH	Su	LC		Mam (Souss), Man, Op (Lower Moulouya), LM, R
<i>Xanthium spinosum</i> L.	Th	S, A, SA, SH	S, Su	NA		MA central, Mam, Man, Op, Om, LM, R
BORAGINACEAE						
<i>Anchusa italica</i> Retz	Hem	A, SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Borago officinalis</i> L.	Th	SA, SH, H	S, Su	LC		AA, HA, MA, Mam (Chaouia-Doukkala), Man, Op, Om, LM, R
<i>Cerinthe major</i> L.	Th	A, SA, SH, H	S	LC		Non-saharan Morocco
<i>Cynoglossum creticum</i> Miller	Th	A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Echium creticum</i> L.	Th	A, SA, SH, H	S, Su	LC		Non-Saharan Morocco
<i>Echium plantagineum</i> L.	Th	A, SA, SH	S, Su	LC		Non-Saharan Morocco
<i>Heliotropium supinum</i> L.	Th	A, SA, SH	Su	LC		AA littoral, MA (Daya of Annoceur), Mam, Man, Op, Om (Bni Snassène), LM, R
BRASSICACEAE						
<i>Biscutella didyma</i> L.	Th	A, SA, SH, H	(W), S, Su	LC		All geographic divisions
<i>Capsella bursa pastoris</i> (L.) Medicus	Th	All bioclimates	Flowering possible all year	LC		All geographic divisions
<i>Lobularia maritima</i> (L.) Desv.	Ch	A, SA, SH	Flowering possible all year	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Nasturtium officinale</i> R. Br.	HyF	A, SA, SH	S	LC		All geographic divisions
<i>Raphanus raphanistrum</i> L.	Th	A, SA, SH, H	S, Su	LC		All geographic divisions except Ms and As
<i>Sinapis alba</i> L.	Th	A, SA, SH	S, (Su)	LC		AA, HA, MA, Mam, Man, Op, LM, R
<i>Sinapis arvensis</i> subsp. <i>arvensis</i> L.	Th	A, SA, SH	S	LC		HA, MA, Mam, Man, Op, Om, LM, R
CAMPANULACEAE						
<i>Campanula dichotoma</i> L.	Th	SA, SH, H	S, Su	LC		All geographic divisions
<i>Campanula erinus</i> L.	Th	A, SA, SH, H	W, S, Su	LC		Non-Saharan Morocco
<i>Campanula lusitanica</i> L.	Th	SA, SH, H	S, Su	LC	EI	AA, HA, MA, Mam, Man, Om, LM, R
<i>Campanula rapunculus</i> L.	Hem	SA, SH, H	S, Su	LC		Western AA, HA, MA, Mam, Man, Om, LM, R

<i>Trachelium caeruleum</i> L. subsp. <i>Caeruleum</i>	Ch	S, A, SA, SH, H	S, Su	LC	EIA	All geographic divisions
CAPRIFOLIACEAE						
<i>Lonicera implexa</i> L.	Ph	SA, SH, H	S, Su	LC		As, Western AA, HA, MA, Mam, Man, Om, LM, R
<i>Scabiosa columbaria</i> L.	Hem	SA, SH, H	(S), Su	LC		HA, MA, Western R
CARYOPHYLLACEAE						
<i>Cerastium brachypetalum</i> Pers. subsp. <i>roeseri</i> (Boiss. & Hedr.) Nyman	Th	SA, SH, H	S, Su	LC		AA (Kest: between Tizi-n-Aït Iftene and Tizi-n-Tagounite, 1600 m), HA, MA, Mam, Man (Zaïane ; Mehdiya)
<i>Corrigiola telephiifolia</i> Pourret	Hem	SA, SH	S, Su	NT		AA(Siroua), HA, MA, Mam, Man, R
<i>Paronychia argentea</i> Lam.	Hem	A, SA, SH, H	W, S, Su	LC		Ms, AA, HA, MA, Mam, Man, Op, R
<i>Paronychia echinulata</i> Chater	Th.	SA, SH	S	LC		HA (Mgouna; Iouaridène), MA, Mam (Khénifra), Man, LM (Melilia), R
<i>Polycarpon tetraphyllum</i> L.	Th	S, A, SA, SH, H	S, Su	LC		Ms, AA, HA, MA, Mam, Man, Om, LM, R
<i>Silene colorata</i> Poiret	Th	A, SA, SH, H	W, S	LC		All geographic divisions except Ms and As
<i>Silene gallica</i> L.	Th	S, A, SA, SH, H	W, S	LC		All geographic divisions except Ms and As
<i>Silene ibosii</i> Embergere & Maire	Th	SH, H	S, Su	NT	E; R	Man (j. Outka), R
<i>Silene vulgaris</i> (Moench) Garcke	G	A, SA, SH, H	W, S, Su	LC		All geographic divisions
<i>Spergularia purpurea</i> (Pers.) G. Don fil.	Th	A, SA, SH, H, HM	S	LC	EI	AA, HA, (Saksaoua), MA (Tazekka), Mam, Man, R(Tanger)
<i>Spergularia salina</i> J. Presl. & C. Presl.	Th	A, SA, SH	S	LC		Ms, HA, Mam, Man, Op, LM, R
<i>Stellaria media</i> (L.) Vill.	Th	A, SA, SH, H, HM	W, S, Su	LC		All geographic divisions except Ms
<i>Velezia rigida</i> L.	Th	SA, SH, H	S, Su	LC		As, AA (Tafraoute), HA, MA, Man, Om, R
CISTACEAE						
<i>Cistus albidus</i> L.	Ph	SA, SH, H	S	LC		Mam, Man, Om, LM, R
<i>Cistus crispus</i> L.	Ch	SA, SH, H	S	LC		MA, Man, LM, R
<i>Cistus monspeliensis</i> L.	Ph	SA, SH	S	LC		HA, MA, Mam, Man, Om, LM, R
<i>Cistus salvifolius</i> L.	Ch	SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Fumana thymifolia</i> (L.) Webb	Ch	A, SA, SH	S	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Helianthemum ledifolium</i> (L.) Mill. Subsp. <i>ledifolium</i> .	Th	A, SA, SH, H	S	LC		All geographic divisions except Ms
<i>Pomelina fontanesii</i> (Pomel) Güemes & Raynaud	Ph	SA	S	LC		HA, MA, Mam, Man, R
<i>Tuberaria guttata</i> (L.) Fourr.	Th	SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Om, LM, R
CONVOLVULACEAE						
<i>Calystegia silvatica</i> (Kit.) Griseb.	G	SA, SH	S, Su	NT		Mam, Man, R
<i>Convolvulus althaeoides</i> L.	Hem	(S), SA, SH, H	S, Su	LC		All geographic divisions, rare in arid and desert regions
<i>Convolvulus arvensis</i> L.	G	S, SA, SH, H	S	LC		All geographic divisions
<i>Convolvulus tricolor</i> L.	Th	S, SA, SH	S	LC		Ms, AA?, Mam, Man, Op (lower Moulouya), Om, R
<i>Cuscuta planiflora</i> Ten.	Th	A, SA, SH, H, HM	S	LC		All geographic divisions except Ms
CRASSULACEAE						
<i>Mucizonia hispida</i> Batt & Trabut subsp. <i>hispida</i>	Th	A, SA, SH, H	S, Su	LC	EIA	HA, MA, Mam, Man, Op, Om, LM, R
<i>Pistorinia breviflora</i> Boiss. subsp. <i>intermedia</i> (Boiss & Reuter) Greuter & Burdet	Th	SA, SH, H	S, Su	LC		AA, Mam, Man
<i>Sedum rubens</i> L.	Th	A, SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Op, R
<i>Umbilicus horizontalis</i> (Guss.) DC.	G	S, A, SA, SH, H	S, Su	NA		Ms, AA, HA, MA, Mam, Man, Om, LM, R
CUCURBITACEAE						
<i>Bryonia dioica</i> Jacq.	G	A, SA, SH, H	S	LC		All geographic divisions
CYTINACEAE						
<i>Cytinus hypocistis</i> L.	G	SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Om, LM, R
ERICACEAE						
<i>Arbutus unedo</i> L.	Ph	SA, SH, H	F, W	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Erica arborea</i> L.	Ph	SH, H	S	LC		MA (Tazekka), Man, Op (j. Kerker south of Tistoutine), Om, LM, R
EUPHORBIACEAE						
<i>Chrozophora tinctoria</i> (L.) A. Juss.	Th	A, SA, SH, H	(F), S, Su	LC		HA? MA, Mam, Man, LM, R
<i>Euphorbia exigua</i> L.	Th	A, SA, SH, H	S, Su	LC		Non-Saharan Morocco

<i>Euphorbia helioscopia</i> L.	Th	(S), A, SA, SH, H	Flowering possible all year	LC		All geographic divisions
<i>Euphorbia medicaginea</i> Boiss	Th	A, H, SA, SH	W, S	LC		MA, Mam, Man, Om (Bni Snassene), LM, R
<i>Mercurialis ambigua</i> L. fil.	Th	S, A, SA, SH, H	(F), W, S, Su	LC		All geographic divisions
FABACEAE						
<i>Anagyris foetida</i> L.	Ph	A, SA, SH, H	W, S	LC		AA, HA, MA, Mam, Man, LM (Bokkoya), R
<i>Anthyllis vulneraria</i> L.	Hem	A, SA, SH, H, HM	S, Su	LC		Non-Saharan Morocco
<i>Astragalus depressus</i> L.	Hem	SA, SH, HM	S, Su	VU	R?	HA (j. Takreda ; Ourika ; Tachdir), MA (Békrit ; j. Hayyan ; j. Moussa-ou-Salah), western R
<i>Astragalus echinatus</i> Murray	Th	A, SA, SH, H	(W), S	LC		AA (Tiguermine),HA, MA,Mam, Man, Om ?, LM, R
<i>Bituminaria bituminosa</i> (L.) Stirton	Hem	A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Calicotome villosa</i> (Poirot) Link	Ph	SA, SH	S	LC		MA, Man, central-western R
<i>Ceratonia siliqua</i> L.	Ph	SA, SH	F, W	LC		As, AA, HA, MA, Mam, Man, Op? Om, LM, R
<i>Coronilla scorpioides</i> (L.) Koch	Th	S, A, SA, SH	S, Su	LC		All geographic divisions
<i>Coronilla valentina</i> L.	Ph	A, SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Cytisus arboreus</i> (Desf) DC. Subsp. <i>baeticus</i> (webb) Maire	Ph	SA, SH, H	W, S	LC	EIA	AA, HA, MA, Mam, Man, Om, LM, R
<i>Dorycnium rectum</i> (L.) Ser.	Ch	A, SA, SH, H	S, Su	DD		AA (o. Noun), HA, MA, Mam, Man (Bni Snassène), R
<i>Genista clavata</i> Poirot	Ph	SH	S	VU	E; R	Man, R
<i>Glycyrrhiza foetida</i> Desf.	G	SA, SH	S, Su	NT		Man, Central Western R
<i>Hedysarum flexuosum</i> L.	Th	SA, SH	S, Su	NT		Man, R
<i>Lathyrus ochrus</i> (L.) DC.	Th	A, SA, SH	S	LC		Mam, Man, Op, Om, LM, R
<i>Lathyrus tingitanus</i> L.	Th	SH, H	S, Su	NT		Man, R
<i>Lotus arenarius</i> Brot.	Th	A, SA, SH, H	(W), S, (Su)	LC	EIC	Ms, AA, HA, MA, Mam, Man, Op (Midelt), R(Tangérois)
<i>Lotus hispidus</i> DC.	Th	SA, SH, H	S, (Su)	LC		Mam (Chaouia- Doukkala), Man, LM? R
<i>Lotus ornithopodioides</i> L.	Th	SA, SH	(W), S	LC		AA, Mam (Chaouia- Doukkala), Man, Om (Bni Snassène), LM, R
<i>Lotus parviflorus</i> Desf.	Th	SA, SH	S	LC		MA (Bab Azhar; Bab Frej), Man, LM? R
<i>Lupinus angustifolius</i> L.	Th	SA, SH	S	LC		AA, HA, MA, Mam (Souss), Man, R
<i>Medicago orbicularis</i> (L.) Bart.	Th	A, SA, SH, H	(W), S, (Su)	LC		Western AA, HA, MA, Mam, Man, Op (W of Oujda), Om, LM, R
<i>Medicago polymorpha</i> L.	Th	A, SA, SH, H	(W), S (Su)	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Melilotus indicus</i> (L.) All.	Th	S, A, SA, SH, H	(W), S (Su)	LC		Ms(Laâyoune; Assa), AA, HA, Mam, Man, Op, Om, LM, R
<i>Melilotus sulcatus</i> Desf.	Th	(S), A, SA, SH, H	(W), S, (Su)	LC		Ms (Tantan; Assa ; Figuig ...), AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Ononis alopecuroides</i> L. subsp. <i>exalopecurioides</i> (G. Lopez) Greutteur & Burdet	Th	SA, SH	S, (Su)	LC		Mam, Man, R
<i>Ononis natrix</i> L.	Ch	S, A, SA, SH	S	LC		All geographic divisions
<i>Ornithopus compressus</i> L.	Th	A, SA, SH, H	S	LC		AA, HA, MA, Mam, Man, R
<i>Scorpiurus vermiculatus</i> L.	Th	A, SA, SH, H	S	LC		MA, Mam, Man, Om (Bni Snassène), LM, R
<i>Trifolium angustifolium</i> L.	Th	A, SA, SH, H	S, (Su)	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Trifolium arvense</i> L.	Th	A, SA, SH, H	S, (Su)	LC		AA, HA, MA, Mam, Man, LM, R
<i>Trifolium stellatum</i> L.	Th	SA, SH, H	S, (Su)	LC		Western AA, HA, MA, Mam, Man, Om, LM, R
<i>Tripodion tetraphyllum</i> (L.) Fourr.	Th	(S), A, SA, SH	W, S, Su	LC		Ms (Guelmim), AA, HA, MA, Mam, Man, Op, Om, LM, R
FAGACEAE						
<i>Quercus coccifera</i> L.	Ph	SA, SH, H	S	LC		Om, LM, R
<i>Quercus Rotundifolia</i> Lam.	Ph	SA, SH, H	S, Su	LC		All geographic divisions except Ms and Op
GENTIANACEAE						
<i>Blackstonia perfoliata</i> (L.) Hudson	Th	SA, SH, H	S, Su	LC		HA, MA, Man, Om, LM, R
<i>Centaurium erythraea</i> Rafn.	Th	SA, SH, H	S, Su	DD		Western AA, HA, MA, Mam, Man, Om, LM, R
<i>Centaurium pulchellum</i> (Swartz) Druce	Th	SA, SH, H	S, Su	DD		Ms oceanic, As, AA (Ida-ou-Gnidif), MA, Man (High Ouergha Fourat ; salé), Om, LM, R
GERANIACEAE						
<i>Erodium cicutarium</i> (L.) L'Hér.	Th	A, SA, SH, H, HM	W, S, (Su)	LC		Oriental Ms, AA, HA, MA, Man, Op, Om, LM, R
<i>Erodium malacoides</i> (L.) L'Hér.	Th	A, SA, SH, H	W, S, (Su)	LC		Ms, AA, HA, MA, Mam, Man, Op, LM, R

<i>Erodium moschatum</i> (L.) L'Hér.	Th	A, SA, SH, H	W, S	LC		HA, MA, Mam, Man, Om, LM, R
<i>Geranium dissectum</i> L.	Th	A, SA, SH, H	(W), S, (Su)	EN		western AA, HA, MA, Mam, Man, Op, LM, R
<i>Geranium molle</i> L.	Th	A, SA, SH, H	W, S, (Su)	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Geranium purpureum</i> Vill.	Th	A, SA, SH, H	(W), S, (Su)	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Geranium rotundifolium</i> L.	Th	A, SA, SH, H	(W), S, (Su)	LC		All divisions except Ms
HYPERICACEAE						
<i>Hypericum perforatum</i> L.	Ch	SA, SH, H	S, Su	LC		Mam, Man, Om, LM, R
<i>Hypericum tomentosum</i> L.	Hem	S, SA, SH	S, Su	NT		HA (Rich), MA (Ifrane), Mam, Man, Op, LM, R
LAMIACEAE						
<i>Ajuga iva</i> (L.) Schreber	Hem	A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Cleonia lusitanica</i> L.	Th	A, SA, SH	S	LC		HA, MA, Mam, Man, Op (Bni Snassène), LM, R
<i>Clinopodium nepeta</i> (L.) Kuntze	Ch	SA, SH, H	W, S, Su	LC		HA, MA, Man, Om, LM, R
<i>Lamium amplexicaule</i> L.	Th	S, A, SA, SH, H	W, S, Su	LC		All geographic divisions
<i>Lavandula multifida</i> L.	Ch	A, SA, (SH)	S, F	LC		Non-Saharan Morocco
<i>Lavandula stoechas</i> L.	Ch	SA, SH	S	LC		Mam, Man, LM, Om, R
<i>Marrubium vulgare</i> L.	Ch	A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Mentha pulegium</i> L.	Hem	SA, SH, H	S, Su	DD		Non-Saharan Morocco
<i>Mentha suaveolens</i> Ehrh.	Hem	S, A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Nepeta apuleii</i> Uria	Hem	SA, SH, H	S, Su	LC		Non-Saharan Morocco
<i>Origanum compactum</i> L.	Ch	A, SA, SH	Su	VU	EI	MA, Mam, Man, R
<i>Phlomis crinita</i> Cav. subsp. <i>mauritanica</i> (Munby) Murb.	Hem	SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Phlomis herba-venti</i> L. subsp. <i>heba-venti</i>	Hem	A, SA	S	LC		Ms?, As, HA, MA, Mam, Man, Om, LM, R
<i>Prasium majus</i> L.	Ph	SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Salvia argentea</i> L. subsp. <i>patula</i> (Desf.) Maire	Hem	A, SA, SH, H	S, Su	LC		Western AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Salvia verbenaca</i> L.	Hem	A, SA, SH, H	S, Su	LC		All geographic divisions
<i>Stachys arvensis</i> L.	Th	SA, SH, H	W, S	LC		Non-Saharan Morocco
<i>Stachys circinata</i> L'Hér. subsp. <i>zaiana</i> Emberger & Maire	Ch	SH H	W, S	LC	E, RR	MA Man Op? LM R
<i>Stachys germanica</i> L. subsp. <i>cordigera</i> Briq.	Hem	SH, H	S	NT		AA (Col du Kerdouss), Man (Zerhoun ; N Hills of Fès), Op ?, R
<i>Stachys ocymastrum</i> (L.) Briq.	Th	A, SA, SH, H	S	LC		Non-Saharan Morocco
<i>Teucrium barbarum</i> Jahand. & Maire.	Ph	SA, SH	S, Su	EN	E ; R	Man, R
<i>Teucrium decipiens</i> Cosson & Balansa.	Th	SA, SH	S	LC	E	HA, MA, Mam, Man, Om (Bni Snassène), LM, R
<i>Teucrium fruticans</i> L.	Ph	SA, SH, H	W, S, Su	LC		(Ms), AA, HA, MA, Mam, Man, Om, LM, R
<i>Teucrium polium</i> L.	Ch	SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Teucrium spinosum</i> L.	Th	SA	S, Su	LC		MA? Mam (Chaouia-Doukkala), Man, LM?, R
<i>Vitex agnus castus</i> L.	Ph	S, A, SA, SH, H	Su	LC		All geographic divisions
LINACEAE						
<i>Linum setaceum</i> Brot.	Th	SA, SH	S, Su	LC	EI	Mam, Man, LM, R
<i>Linum usitatissimum</i> L.	Th		S, Su	NA		Cultivated and spontaneous especially in Mam, Man, LM, R
LYTHRACEAE						
<i>Lythrum junceum</i> Banks & Solander	Hem	A, SA, SH, H	S, Su	LC		All geographic divisions
MALVACEAE						
<i>Lavatera albia</i> L.	Ph	SA, SH, H	S, (Su)	LC		MA, Mam, Man, LM, R
<i>Malva hispanica</i> L.	Th	A, SA, SH, H	(W), S	LC	EIA	?AA, HA, MA, Mam, Man, LM, Om, R
<i>Malva sylvestris</i> L.	Hem	All bioclimats	(W), S, Su	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
MOLLUGINACEAE						
<i>Glinus lotoides</i> L.	Th	S, SA, SH	Su	NT	R	Ms (O. Chebeika near d'Abattih), Man (O.Fouarate; Maâmara; Ain Sferjla)
MORACEAE						
<i>Ficus carica</i> L.	Ph	A, SA, SH, H	S, Su	NA		Non-Saharan Morocco
MYRTACEAE						
<i>Myrtus communis</i> L.	Ph	SA, SH	S	NT		Man, Om (Bni Snassène), LM, R
OLEACEAE						
<i>Fraxinus angustifolia</i> Vahl	Ph	SA, SH, H	W, S	LC		HA, MA, Mam, Man, Om, LM, R
<i>Jasminum fruticans</i> L.	Ph	SA, SH	S	LC		As, AA, HA, MA, Mam, Man, Om, LM, R
<i>Olea europaea</i> L. subsp. <i>oleaster</i> (Hoffm. & Link) Negodi	Ph	A, SA, SH, H	S	LC		Non-Saharan Morocco
<i>Phillyrea latifolia</i> L.	Ph	SA, SH	W, S	LC		As, AA, HA, MA, Mam, Man, Om, LM, R

OROBANCHACEAE						
<i>Orobanche crenata</i> Forsskal	Th	A, SA, SH, H	S	LC		As, AA littoral? HA, Mam, Man, Op, Om, LM, R
<i>Orobanche foetida</i> Poiret	G	SA, SH	S	LC		HA, Mam, Man (Prerif), R (Tangérois)
<i>Orobanche ramosa</i> L.	G	S, A, SA, SH, H	S, (Su)	LC		All geographic divisions
<i>Parentucellia viscosa</i> (L.) Caruel	Th	A, SA, SH, H	(W), S, (Su)	LC		HA, MA, Mam, Man, Om, LM, R
OXALIDACEAE						
<i>Oxalis pes-caprae</i> L.	G	A, SA, SH	W, S	LC		Mam, Man, Op, Om, LM, R
PAPAVERACEAE						
<i>Fumaria ouezzanensis</i> Pugsley subsp. <i>ouezzanensis</i>	Th	SH	S	NT	E; R	Man, R(Prerif)
<i>Fumaria rupestris</i> Boiss. & Reuter subsp. <i>rupestris</i>	Th	SA, SH, H	S, Su	LC	EIA	MA, Om (Bni Snassène); to research in AA, HA, Mam, Man, R
<i>Papaver rhoeas</i> L.	Th	A, SA, SH, H	S, Su	LC		All geographic divisions
PLANTAGINACEAE						
<i>Linaria amethystea</i> (Vent.) Hofm. & Link	Th	(S), A, SA, SH, H	(W), S, (Su)	LC	EI	Ms (Tantan), HA, MA, Mam, Man, R (Tangérois)
<i>Plantago afra</i> L.	Th	A, SA, SH, H	S	LC		All geographic divisions
<i>Plantago coronopus</i> L. subsp. <i>commutata</i> (Guss.) Pilger	Th	A, SA, SH	S, Su	LC		All geographic divisions
<i>Plantago coronopus</i> L. subsp. <i>coronopus</i> (Guss.) Nyman	Th	SA, SH, H	S, Su	LC		Ms (Errachidia; Laayoune), MA (Tazekka), Man, Op, (Msoun), Om (Bni Snassène) LM(Imzorène), R
<i>Plantago lagopus</i> L.	Th	S, A, SA, SH, H	W, S	LC		All geographic divisions
<i>Plantago macrorhiza</i> Poiret	Th	SA, SH	S	LC		Mam (Chaouia-Doukkala), Man, Op (Lower Moulouya), LM, R
<i>Plantago major</i> L.	Hem	S, A, SA, SH, H	S, Su, F	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Veronica hederifolia</i> L.	Th	SA, SH, H	W, S, (Su)	LC		As, AA (Siroua), HA, MA, Man, Om (Bni Snassène), LM, R
PLUMBAGINACEAE						
<i>Plumbago europaea</i> L.	Ch	A, SA, SH, H	Su, F	LC		AA, HA, MA, Mam, Man, Om, LM, R
POLYGONACEAE						
<i>Emex spinosa</i> (L.) Campd.	Th	S, A, SA, SH, H	W, S	LC		All geographic divisions
<i>Persicaria lappathifolia</i> (L.) S.F. Gray	Th	A, SA, SH, H	Su	LC		HA, MA, Mam, Man, LM, R
<i>Polygonum aviculare</i> L.	Th	SA, SH, H	S, Su	LC		All geographic divisions
<i>Rumex bucephalophorus</i> L.	Th	A, SA, SH, H	W, S	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Rumex conglomeratus</i> Murray	Hem	A, SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Op, Om, LM, R
<i>Rumex thyrsoides</i> Desf.	Hem	SA, SH, H	S	LC		AA, HA, MA, Mam, Man, Om, LM, R
PRIMULACEAE						
<i>Anagallis arvensis</i> L. subsp. <i>arvensis</i>	Th	A, SA, SH, H	Flowering possible all year	LC		All geographic divisions except Ms & AA
<i>Anagallis monelli</i> L. subsp. <i>monelli</i>	Ch	A, SA, SH, H, HM	S, Su	LC		Ms (around Errachidia), AA (Tazeroualt), HA, MA, Mam, Man (Ouezzane ; Bni Aros ; Brikcha ; o. Mkikes ; around Rabat), Op (Midel), LM (Melilia), R (around Tanger)
RANUNCULACEAE						
<i>Clematis cirrhosa</i> L.	Ph	SA, SH, H	F, W	LC		MA, Mam, Man, Om, LM, R
<i>Clematis flammula</i> L.	Ph	SA, SH, H, HM	S, Su	LC		MA, Mam, Man, Op, Om, LM, R
<i>Delphinium cossonianum</i> Batt.	Th	SA, SH	S	LC	E	Mam, Man
<i>Ficaria verna</i> subsp. <i>ficariiformis</i> (Rouy & Foucaud) Sóo	Hem	SA, SH, H	F, S	LC		HA, MA, Man, R
<i>Ranunculus bulbosus</i> L.	Hem		S	LC		AA, HA, MA, Mam, Man, Op, R
<i>Ranunculus bullatus</i> L.	Hem	SA, SH, H	F, W	LC		AA, HA, MA, Mam, Man, Om, LM, R(Tanger)
<i>Ranunculus parviflorus</i> L.	Th	SA, SH, H	S	LC		HA, MA, Man, R
RESEDACEAE						
<i>Reseda lutea</i> L.	Th	S,A, SA, SH	W, S, Su	LC		All geographic divisions except As
RHAMNACEAE						
<i>Rhamnus alaternus</i> L.	Ph	SA, SH, H	W, S	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Rhamnus lycioides</i> L.	Ph	SH	S, Su	LC		All geographic divisions
<i>Ziziphus lotus</i> (L.) Lam. subsp. <i>lotus</i>	Ph	S, A, SA, SH	S, Su	LC		All geographic divisions
ROSACEAE						

<i>Crataegus monogyna</i> Jacquin	Ph	SA, SH, H	W, S	LC		All geographic divisions except Ms and As
<i>Rosa sempervirens</i> L.	Ph	SA, SH, H	W, S	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Rubus ulmifolius</i> Schott.	Ph	A, SA, SH, H	S, Su	LC		All geographic divisions except Ms and As
<i>Sanguisorba minor</i> Scop.	G	A, SA, SH, H	S, Su	LC		Everywhere except in Ms and LM
RUBIACEAE						
<i>Galium murale</i> (L.) All.	Th	A, SA, SH, H	(W), S, (Su)	LC		Ms (Mechra Sfi), AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Galium parisiense</i> L.	Th	A, SA, SH, H	(W), S, Su	LC		AA, HA, MA, Mam, Man, Om, LM, R
<i>Galium verrucosum</i> Hudson	Th	S, A, SA, SH, H	W, S	LC		Ms (Assa), AA, HA, MA, Mam, Man Op (Lower Moulouya), Om, LM, R
<i>Rubia peregrina</i> L.	Ch	A, SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Om, LM, R
<i>Sherardia arvensis</i> L.	Th	A, SA, SH, H	W, S, (Su)	LC		All geographic divisions
RUTACEAE						
<i>Ruta montana</i> L.	Ch	A, SA, SH	S, Su	LC		HA, MA, Mam, Man, Om (Bni Snassène), LM, R
SALICACEAE						
<i>Salix pedicellata</i> Desf.	Ph	SAd, SH, H	W, S	LC		All geographic divisions except Ms
<i>Salix purpurea</i> L.	Ph	SAd, SH, H	S	LC		AA, HA, MA, Mam, R
SANTALACEAE						
<i>Osyris alba</i> L.	Ch	SA, SH, H	S, Su	LC		Ms?, As ?, AA ?, HA, MA, Mam, Man, Om, LM, R
SAXIFRAGACEAE						
<i>Saxifraga granulata</i> L.	Hem	SA, SH, H	S	LC		HA, MA, Man, Om (Bni Snassène), R
SCROPHULARIACEAE						
<i>Anarrhinum pedatum</i> Desf.	Hem	A, SA, SH, H	(W), S, (Su)	LC		HA, MA, Mam, Man, Om, LM, R
<i>Kickxia spuria</i> (L.) Dumort.	Th	S, SA, SH, H	S, Su	LC		Ms (around Tinfouche; N of Hassi Beïda; o. Oum el-Assef), Mam, Man, Op, Om, LM, R
<i>Linaria latifolia</i> Desf.	Th	A, SA, SH	(W), S	NT	EIA	MA(Tazekka), Mam, Man, LM, R
<i>Misopates calycinum</i> (Vent.) Rothm.	Th	A, SA, SH, H, HM	S, Su	LC		Ms oceanic, HA, MA, Mam, Man, Op, Om, LM, R
<i>Scrophularia canina</i> L.	Ch	A, SA, SH, H	(W), S, Su	LC		All geographic divisions
<i>Scrophularia laevigata</i> Vahl	Hem	SA, SH, H	S, Su	LC		HA, MA, Mam, Man, Om, LM, R
<i>Scrophularia sambucifolia</i> L.	Ch	(S), A, SA, SH, H	(W), S, (Su)	NT	EIA	Ms ?, HA, Man, LM, R
<i>Verbascum sinuatum</i> L.	Th	A, SA, SH, H	S, Su	LC		All geographic divisions except Ms
SOLANACEAE						
<i>Datura stramonium</i> L.	Th	S, A, SA, SH	S, Su, F	NA		All geographic divisions
<i>Hyoscyamus albus</i> L.	Th	A, SA, SH, H	S, Su	LC		AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Mandragora autumnalis</i> Bertol.	G	SA, SH	S, Su	LC		Mam, Man, LM, R
<i>Solanum nigrum</i> L.	Th	S, A, SA, SH, H	S, Su	LC		Oceanic Ms, AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Solanum linnaeanum</i> Hepper & P.-M. L. Jaeger	Ph	A, SA, SH	S, Su	NA		Mam, Man, Om (Bni Snassène), LM, R
TAMARICACEAE						
<i>Tamarix canariensis</i> Willd.	Ph	A, SA, SH	S, Su	NA		Ms, Mam (Ait Amer ; Essaouira ; o. Massa), R (Tetouan)
THYMELAEACEAE						
<i>Daphne gnidium</i> L.	Ch	SA, SH	S	LC		All geographic divisions except Ms
URTICACEAE						
<i>Urtica membranacea</i> Poiret	Th	A, SA, SH, H, HM	S	LC		HA, MA, Mam, Man, Op, Om, LM, R
VALERIANACEAE						
<i>Centranthus calcitrapae</i> (L.) Duf. subsp. <i>calcitrapae</i>	Th	A, SA, SH, H	(W), S, (Su)	LC		AA, HA, MA, Mam, Man, Om (Bni Snassène), LM, R
<i>Fedia cornucopiae</i> (L.) Gaertner	Th	A, SA, SH, H	(W), S	LC	EI	MA (Tazekka), Mam (Chaouia-Doukkala), medium Oum Rbia), Man, western LM, R
<i>Valerianella dentata</i> (L.) Pollich	Th	A, SA	S	LC	RR	Central HA, MA (Tezekka), Man (Prerif-Middle Sebou), Op (Lower Moulouya), LM, R
VERBENACEAE						
<i>Verbena officinalis</i> L.	Ch	S, A, SA, SH, H	S, Su	LC		Ms (Assa), AA, HA, MA, Mam, Man, Op, Om, LM, R
<i>Verbena supina</i> L.	Th	A, SA, SH	S, Su	LC		Ms, AA, Mam, Man, LM, R
VITACEAE						
<i>Vitis vinifera</i> L.	Ph	SA, SH, H	S	LC		HA, MA, Mam, Man, Om, LM, R