

A FLORISTICAL AND ECOLOGICAL STUDY OF THE MEDICINAL FLORA USED BY THE LOCAL POPULATION OF THE HAOUZ-REHAMNA REGION (MIDDLE ATLANTIC MOROCCO-4)

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(Received 11 July 2023; Accepted 9 October 2023)

To carry out a floristical inventory of plants used in traditional medicine in the Haouz-Rehamna region, a series of ethnobotanical surveys were conducted during five campaigns (2012–2017) with a representative sample of 1,700 people. These researches are completed by the determination of species collected in the field. It is worth mentioning that, taking into account the recent changes at the international level on taxonomy, the results obtained allowed us to elaborate a catalogue of 415 plant species (bryophytes (2 species); lichens (1), superior mushrooms (1), pteridophytes (4), gymnosperms (8), chlamydosperms (2) and angiosperms (397)) belonging to 291 genera and 99 botanical families, of which nine are the most representative and total 53.49%, namely: Asteraceae (11.33%), Lamiaceae (10.12%), Fabaceae (8.43%), Apiaceae (6.50%), Solanaceae (4.34%), Poaceae (3.86%), Rosaceae (3.37%), Brassicaceae (3.13%) and Cucurbitaceae (2.41%). On the contrary, the other 90 families represent a specific number less than or equal to 1.93%. The data also reflect a high degree of monotypic, where a single species represented 47.48% of the recorded families, and 79.03% of the genera were monotypic. The spontaneous plants occupy the first place with 241 species (58.07%). In addition, the classification by genus showed that the genus *Mentha* is the most used by its number of species (8 species). Moreover, we noted the use of 12 hybrid species. The chorological analysis revealed the domination of taxa with Mediterranean distribution for spontaneous species. Therophytes (27%) and phanerophytes (23.36%) are the most represented life forms. The results of this study could serve as a basis for future research in the field of floristics and ecology for the conservation of biodiversity.

Key words: chorology, diversity, ethnobotany, Haouz-Rehamna, Morocco, phytoecology.

INTRODUCTION

Since ancient times, medicinal plants have always been used by all cultures for their healing properties. Through the centuries, human traditions have developed the knowledge and use of medicinal plants to mollify and lessen suffering and improve human health. Like many countries, Morocco has an

old tradition and essential expertise in the traditional pharmacopoeia. Among its natural floristical procession, about a thousand species are used to varying degrees (Fennane and Rejdali 2016). Moreover, Morocco has significant floristical wealth. Its vascular flora (5,211 species and subspecies) is estimated at 3,913 species, 426 type subspecies (autonomous) and 872 additional subspecies, distributed in 981 genera and 155 families (Fennane and Ibn Tattou 2012).

However, the medicinal flora remains unknown until today because out of the several thousand plant species, there are some 800 drugs used, 600 of which are used in traditional medicine (Hmamouchi 2001).

On the other hand, the renewed global interest in medicinal and aromatic plants (MAP), encouraged by the development of the pharmaceutical and cosmetic industry, has increased the pressure on these resources (Benkhnigue *et al.* 2022, 2023, Chaachouay *et al.* 2022). According to Fennane and Rejdali (2016), about thirty indigenous species are traded inside and outside the country and are subject to abusive and unchecked exploitation. Plant material harvesting practices generally ignore important taxonomic, chorological, and biological considerations, jeopardising species survival.

This study aimed to elaborate on the most exhaustive catalogue possible of medicinal plants used in traditional phytotherapy in the region of Haouz-Rehamna by focusing on a quantitative and qualitative analysis of the medicinal flora of this study area. This is done through significant parameters: the specific richness, the life form spectrum, the bioclimatic stage, the chorology and the biotope.

MATERIALS AND METHODS

Description of the study area – From a floristical point of view, Morocco was subdivided by Fennane and Ibn Tattou (1998, 2005) and Ibn Tattou and Fennane (2008) in their catalogues into 11 phytogeographical regions (Fig. 1): Saharan Morocco (Ms), Saharan Atlas (As), Anti Atlas (A.A.), High Atlas (H.A.), Middle Atlas (M.A.), Middle Atlantic Morocco (Mam), North Atlantic Morocco (Man), Eastern Moroccan Plateaux (Op), Eastern Moroccan Mountains (Om), Mediterranean Littoral (L. M.) and Rif (R). The Haouz-Rehamna region is one of these (noted as Mam-4). It is a homogeneous floristical region located in central Morocco in the west. It is limited to the south by Ida-Ou-Tanane (HA-1), Seksaoua (HA-2) and Central High Atlas (HA-3), to the west by the Abda-Haha region (Mam-2), to the north by the Chaouia-Doukkala region (Mam-1), to the northeast by the Middle Oum-Errabiâ region (Mam-5) and to the east by the Mgoun region (HA-4). Geographically and geologically, the study area includes four natural zones: the plateau areas (Rehamna and Bahira plateaus), the plain areas (Haouz, Rehamna and Tassaout upstream and downstream plains), the basin area (Essaouira-Chichaoua) and the minimal moderate altitude mountain

area (Jbilets range) (Piqué *et al.* 1993). The region's climate is Mediterranean, with an average rainfall of 800 mm per year in the mountainous area and 190 mm in the plain (MGRMS 2015). The average annual temperature is around 18.5 °C. The average maximum is 37.7 °C, and the minimum is 4.9 °C (Samia *et al.* 2018). Two bioclimates are represented along an altitudinal gradient: arid with temperate winter and semi-arid with warm winter (Nègre 1959).

The hydrographical system of the region has a reasonably large surface and groundwater. The surface water includes a large watershed, that of Tensift, and part of the Oum Errabia, located in the eastern part of the region, formed by several sub-catchments and draining the northern slopes of the High Atlas, with inputs of pluvionivale origin (Abourida 2007).

The pedological studies carried out in the entire study area (Billaux and Bayssine 1967, Cavallar 1950) have shown the presence of different types of soils: calco-magnesimorphic, isohumic, vertisols (shootings), red soils on schist, halomorphic, regosols, hydromorphic and soils little evolved by erosion. Their



Fig. 1. Map of phytogeographical divisions of northern Morocco (from Fennane and Ibn Tattou 1998, 2005, Ibn Tattou and Fennane 2008) showing the study area

texture is generally silty-clay, silty and silty-sandy. The vegetation of the study area is in the arid Mediterranean vegetation stage; in the Rehamna and Haouz-Tadla, it is represented by a bush with *Withania frutescens* (L.) Pauquy, *Ziziphus lotus* (L.) Lam., *Acacia gummifera* Willd., *Pistacia atlantica* Desf. here is very rare. The bedrock of the Djebilets brings a great variety in the herbaceous flora of the *Acacia* bush; let us note *Forsskaolea tenacissima* L., *Andropogon laniger* Desf., *Pennisetum ciliare* Link, *Fumaria ballii* Pugsley (endemic to Morocco), *Ceterach officinarum* DC., *Cheilanthes fragrans* (L. f.) Webb et Berthel, *Boerhavia repens* Sieber, etc. The vegetation cover is generally precarious and highly reduced on the slopes (Benkhnigue *et al.* 2022, 2023, Nègre 1959). A few stunted bushes of *Acacia gummifera* Willd. and *Ziziphus lotus* Lam., very scattered here and there *Withania frutescens* (L.) Pauquy or *Ephedra* L. are the only representatives of shrubby vegetation we have encountered (Emberger 1938).

ETHNOBOTANICAL AND FLORISTICAL METHODOLOGY

Survey – Using 1,700 questionnaire forms, ethnobotanical field surveys and floristical surveys were conducted during five campaigns from March 2012 to September 2017. The location of the different ethnobotanical and floristical survey environments was identified by “stratified probabilistic” sampling techniques (Godron 1971, Godron and Daget 1982). In this work, the study area was divided into 34 homogeneous strata that constitute the main entrances (North, South, East and West) of the region: 01 = Marrakech, 02 = Ait-Ourir, 03 = Ksiba, 04 = Tamensourte, 05 = El-Kelaâ des Sraghna, 06 = Laataouia, 07 = Imintanoute, 08 = Youssofia, 09 = Echemmaia, 10 = Sidi Bou Othmane, 11 = Ouelad hassoune, 12 = Si Thami, 13 = Sidi Rahal, 14 = Tamel-lalte, 15 = Chichaoua, 16 = Sid L’Mokhtar, 17 = Benguerir, 18 = Sebt Brikyne, 19 = Jemaat-Ghmate, 20 = Tahennaoute, 21 = Tamesloulhete, 22 = Lamzoudia, 23 = Skhour rehamna, 24 = Tlat Ouelad-Dlim, 25 = Majjate, 26 = Assahrij, 27 = Tnin Bouchane, 28 = Mtal, 29 = Jaidate, 30 = Mguedgua, 31 = Ras Ain Rehamna, 32 = Sidi Ghanem, 33 = Sid Zwine and 34 = Mechraa-Ben Aabou (Fig. 2). Using simple random sampling, small samples (50 people) are then formed for each of the 34 strata and put together to create the overall sample (1,700 people). Depending on the availability of the interviewees, interviews were conducted in groups or individually. The time allocated to each interview was approximately 30 minutes to three hours.

Collection and identification – The ethnobotanical study was carried out following a series of surveys with the help of a pre-established questionnaire with questions based on four axes: the informant, the plant material, the mode of use of each plant and the disease to be cured. Thus, plant sampling missions were organised in natural environments, during five campaigns from 2012 to 2017, in order to create control herbaria for each plant used. Deter-

mining the observed and harvested plants was based on the primary relevant studies (Bellakhdar 1997, Fennane *et al.* 1999, 2007, 2014, Nègre 1961–1962).

Arduous identifications were verified in the herbarium (RAB) as well as via database websites: Jstore (<https://www.jstor.org>), The Global Biodiversity Information Facility (<https://www.gbif.org>) and The World Flora Online (<http://www.worldfloraonline.org>). The adopted nomenclature of plant taxa follows the International Plant Name Index (IPNI, <https://www.ipni.org/>), and it conforms to that of Fennane and Ibn Tattou (2005), Ibn Tattou and Fennane (2008) as well as that of the Synonymic index of the North African flora (Dobignard and Chatelain 2010–2013) and Angiosperm Phylogeny Group IV (APG 2016). The life form spectrum of inventoried plants was made according to Raunkiaer (1934). However, a chorological analysis of the inventoried taxa was done to assign the recorded species to global geographical groups according to Fennane and Ibn Tattou (2005), Ibn Tattou and Fennane (2008), Dobignard and Chatelain (2010–2013); when data are available and then completed from Plants of the world online (<https://powo.science.kew.org>).

Data processing and statistical analysis – The data from these surveys are processed by SPSS (Statistical Package for the Social Sciences, IBM, New York, USA) version 21. In this study, we adopted two aspects (floristical and ecological) and several specific quantitative and qualitative analyses to analyse better, interpret and even evaluate the results.

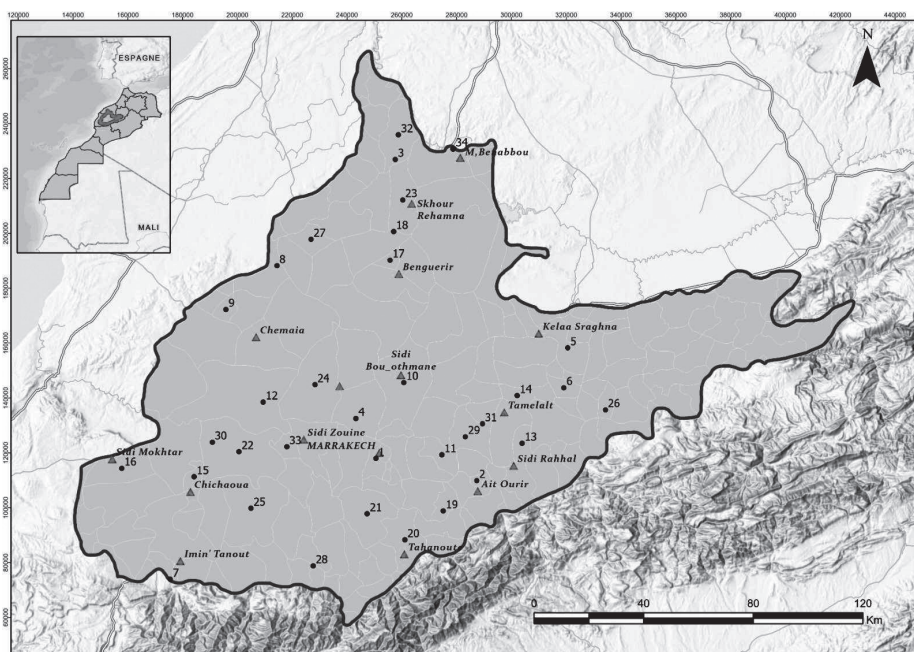


Fig. 2. Map of the study area showing surveyed stations (Benkhnigue *et al.* 2022, 2023)

RESULTS AND DISCUSSION

Botanical and floristical aspects

The results of the field surveys allowed us to elaborate on a catalogue of 415 plant species attached to 291 genera and 99 botanical families. The inventoried species are grouped into seven systematic groups (Table 1).

The families and taxa are presented in alphabetical order within each group. For each species, we note the life form spectrum, the type of plant (spontaneous, naturalised, cultivated or imported), the flowering period and bioclimatic stage, the chorology and the habitat (Appendix). The analysis of Tables 1 and Appendix shows a clear dominance of angiosperms, they include 87 families, 277 genus and 397 species. Among the latter, the dicotyledons are dominant, with 72 families and 350 species (88.16%), while the monocotyledons are represented by only 15 families and 47 species (11.84%). The ratio of the number of monocotyledonous species to the number of dicotyledonous species ($M/D \times 100$) is 13.43%, which is close to that found by El Hilah (2016): 13.61% for the Central Plateau and that found by Hachi (2017): 14.94% for the Central Middle Atlas. Gymnosperms occupy the second place with four families (Cupressaceae, Pinaceae, Ginkgoaceae and Taxaceae), six genera (*Cupressus*, *Ginkgo*, *Juniperus*, *Tetraclinis*, *Pinus* and *Taxus*), and 8 species (*Cupressus atlantica* Gaussen, *Ginkgo biloba* L., *Juniperus oxycedrus* L., *Juniperus phoenicea* L., *Tetraclinis articulata* Mast., *Cedrus libani* A. Richard subsp. *atlantica* (Endl.) Batt. et Trab., *Pinus halepensis* Miller and *Taxus baccata* L.). Thus, spermatophytes are represented by 91 families. This number of families represents 58.70% of the families of the Moroccan vascular flora, according to Fennane and Ibn Tattou (2012). While other families belonging to other systematic groups are represented by only one, two or three families. Thus, chlamydosperms are represented by only one family (Ephedraceae), one genus (*Ephedra*) and two species (*Ephedra altissima* Desf. and *Ephedra fragilis* Desf.). The bryophytes are represented by two families (Brachytheciaceae and Hypnaceae), two genera (*Homalathecium*, *Hypnum*) and

Table 1
Synthesis of the floristical diversity of medicinal plants used in the Haouz-Rehamna region (N = number)

	Bryo- phytes		Lichens		Superior mushrooms		Pterido- phytes		Gymno- sperms		Chlamydo- sperms		Angio- sperms		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Families	2	2.02	1	1.01	1	1.01	3	3.03	4	4.04	1	1.01	87	87.88	99	100
Genera	2	0.69	1	0.34	1	0.34	3	1.03	6	2.06	1	0.34	277	95.20	291	100
Species	2	0.48	1	0.24	1	0.24	4	0.97	8	1.93	2	0.48	397	95.66	415	100

Table 2
Comparison of the floristic diversity of medicinal plants inventoried in different regions of Morocco

Region	Number of			Authors
	species	genera	families	
Haouz-Rehamna	415	291	99	
Central Middle Atlas	267	211	79	Hachi <i>et al.</i> (2022)
Central plateau	170	146	58	El Hilah (2016)
Rabat area	280	225	77	Hseini (2008)
High Central Atlas	172	148	64	El Alami and Chait (2017)
High Eastern Atlas	115	99	45	Benlamdini <i>et al.</i> (2014)
Agadir-Ida-Outanane Prefecture	98	93	46	El Hafian <i>et al.</i> (2014)
Province of Settât	90	83	44	Tahri <i>et al.</i> (2012)
The city of El Ouatia	131	106	43	Ghourri <i>et al.</i> (2012)
Zaër Region	228	223	79	Lahsissene <i>et al.</i> (2009)
Amezmit area	81	70	47	Benchaaabane (1995)
National Park of Talassemtane	103	82	47	Rhattas and <i>al.</i> (2016)
Province de Khrouribga	204	185	73	Ben Akka <i>et al.</i> (2015)
Beni-Mellal	69	63	38	El Azzouzi and Zidane (2015)
Gharbe area	137	116	57	Bouayyadi <i>et al.</i> (2015)
Eastern Morocco	471	–	–	Kahouadji (1995)

two species (*Homalothecium aureum* (Spruce) H. Rob., *Hypnum cupressiforme* Hedw.) Pteridophytes are represented by three families (Dryopteridaceae, Equisetaceae and Pteridaceae), three genera (*Dryopteris*, *Equisetum* and *Adiantum*) and four species (*Dryopteris filix-mas* (L.) Schott, *Equisetum ramosissimum* Desf., *Equisetum telmateia* Ehrh. and *Adiantum capillus-veneris* L.). Lichens are represented by a single family (Parmeliaceae), a single genus (*Evernia*) and a species (*Evernia prunastri* (L.) Ach.). The higher fungi are represented by a single family (Pezizaceae), a single genus (*Tirmania*) and a single species (*Tirmania nivea* (Desf.) Trappe).

Table 2 compares the floristical diversity of the Haouz-Rehamna area with the results of similar studies conducted in different regions of Morocco. The analysis of this table shows that, except for the eastern Morocco region, our number of respondents is relatively high compared to the number of respondents in the different areas of Morocco; this can be explained by the high number of respondents (1,700), the heterogeneity of the study area (plateau and plains area) or because of the great diversity of habitats (great diversity of ecosystems) and rural and urban inhabitants. Thus, the richness and di-

versity of the medicinal flora of the Haouz-Rehamna region are the results of its geographical position, orography, edaphic structure, geology, and climate conditions (Benkhnigue *et al.* 2023).

Spontaneity

Our study revealed that of the total 415 species inventoried (Table 3), 241 species are spontaneous, while 113 species are cultivated. 51 species are imported. However, there are only 10 naturalised species. The high representation

Table 3. Types of medicinal plants used in the Haouz-Rehamna region and their contribution

Medicinal plants type	Contribution %
Spontaneous	58.07
Cultivated	27.23
Imported	12.29
Naturalised	2.41

of spontaneous species was confirmed by the results of relevant studies, such as Hseini (2008) and Hachi *et al.* (2022). Thus, the spontaneous flora of the Haouz-Rehamna region constitutes an essential reservoir of medicinal plants.

Generic and specific analysis of botanical families of taxa recorded in the study area

According to our results (Table 4), we can say that out of the 99 families encountered in the study area, nine families dominate the medicinal flora, with the predominance of the Asteraceae, followed by the Lamiaceae, the Fabaceae, the Apiaceae, the Solanaceae, the Poaceae, the Rosaceae, the Brassicaceae and the Cucurbitaceae. These families alone total 222 species, i.e., 53.49% of the total number. While 90 families are poor in species and present a specific number lower or equal to 8. The other 47 families are represented by only one species (Table 4).

These results are consistent with those obtained at the national level by Fennane and Ibn Tattou (2012), where we find a clear dominance of the family Asteraceae and a slight modification regarding the classification of other families according to their number of species, except for the family Cucurbitaceae, which are represented by ten species in the study area, while it is described in Morocco by only three species. This can be justified by using cultivated species in the study area.

Regarding the generic aspect, the most represented families in the Haouz-Rehamna region are Asteraceae, Apiaceae, Fabaceae, Lamiaceae, Poaceae, Solanaceae, Brassicaceae, Rosaceae and Cucurbitaceae (Table 4). The other families have a genus number equal to or less than 5.

Table 4
Genera and species richness of families found in the study area

Families	Number of genera	Number of species	% of species
Asteraceae	31	47	11.33
Lamiaceae	16	42	10.12
Fabaceae	23	35	8.43
Apiaceae	24	27	6.51
Solanaceae	10	18	4.34
Poaceae	15	16	3.86
Rosaceae	8	14	3.37
Brassicaceae	9	13	3.13
Cucurbitaceae	6	10	2.41
Amaranthaceae	5	8	1.93
Rutaceae	2	8	1.93
Anacardiaceae	3	6	1.45
Euphorbiaceae	4	6	1.45
Caryophyllaceae	5	5	1.21
Fagaceae	2	5	1.21
Lauraceae	3	5	1.21
Thymelaeaceae	2	5	1.21
Zingiberaceae	5	5	1.21
Asparagaceae	3	4	0.97
Cupressaceae	3	4	0.97
Malvaceae	2	4	0.97
Myrtaceae	4	4	0.97
Papaveraceae	3	4	0.97
Plantaginaceae	2	4	0.97
Ranunculaceae	4	4	0.97
Amaryllidaceae	1	3	0.72
Arecaceae	3	3	0.72
Cistaceae	1	3	0.72
Cyperaceae	2	3	0.72
Oleaceae	2	3	0.72
Piperaceae	1	3	0.72
Plumbaginaceae	3	3	0.72
Polygonaceae	3	3	0.72

Table 4 (continued)

Families	Number of genera	Number of species	% of species
Rhamnaceae	2	3	0.72
Urticaceae	1	3	0.72
Xanthorrhoeaceae	2	3	0.72
Aizoaceae	2	2	0.48
Apocynaceae	2	2	0.48
Burseraceae	2	2	0.48
Cactaceae	1	2	0.48
Caprifoliaceae	2	2	0.48
Colchicaceae	2	2	0.48
Combretaceae	2	2	0.48
Ephedraceae	1	2	0.48
Equisetaceae	1	2	0.48
Iridaceae	2	2	0.48
Lythraceae	2	2	0.48
Moraceae	2	2	0.48
Pinaceae	2	2	0.48
Rubiaceae	2	2	0.48
Zygophyllaceae	2	2	0.48
Verbenaceae	2	2	0.48
Actinidiaceae	1	1	0.24
Annonaceae	1	1	0.24
Araceae	1	1	0.24
Araliaceae	1	1	0.24
Aristolochiaceae	1	1	0.24
Berberidaceae	1	1	0.24
Boraginaceae	1	1	0.24
Brachytheciaceae	1	1	0.24
Bromeliaceae	1	1	0.24
Buxaceae	1	1	0.24
Cannabaceae	1	1	0.24
Capparaceae	1	1	0.24
Costaceae	1	1	0.24
Convolvulaceae	1	1	0.24
Crassulaceae	1	1	0.24

Table 4 (continued)

Families	Number of genera	Number of species	% of species
Cynomoriaceae	1	1	0.24
Dioscoreaceae	1	1	0.24
Dryopteridaceae	1	1	0.24
Ericaceae	1	1	0.24
Gentianaceae	1	1	0.24
Geraniaceae	1	1	0.24
Ginkgoaceae	1	1	0.24
Hypnaceae	1	1	0.24
Juglandaceae	1	1	0.24
Juncaceae	1	1	0.24
Linaceae	1	1	0.24
Musaceae	1	1	0.24
Myristicaceae	1	1	0.24
Nitrariaceae	1	1	0.24
Paeoniaceae	1	1	0.24
Parmeliaceae	1	1	0.24
Pedaliaceae	1	1	0.24
Pezizaceae	1	1	0.24
Phyllanthaceae	1	1	0.24
Portulacaceae	1	1	0.24
Pteridaceae	1	1	0.24
Salicaceae	1	1	0.24
Salvadoraceae	1	1	0.24
Sapotaceae	1	1	0.24
Schisandraceae	1	1	0.24
Scrophulariaceae	1	1	0.24
Styracaceae	1	1	0.24
Tamaricaceae	1	1	0.24
Taxaceae	1	1	0.24
Theaceae	1	1	0.24
Tiliaceae	1	1	0.24
Vitaceae	1	1	0.24
Total: 99	291	415	100

The most represented families in the study area

Table 5 presents the ranking, in decreasing order of species richness, of the eight most important families of the elaborated catalogue and their position in the national and regional flora.

The analysis of Table 5 shows that 8 families have more than ten species each and together account for 212 species, that is 51.08% of the total species richness of the study area. Moreover, there is a clear correspondence between the positions of the richest families of the local and national catalogues with slight changes in the ranking (e.g. the family of Lamiaceae), which comes in second place in the local flora of the study area, while it occupies the sixth place in the national flora, the family of Apiaceae, which occupies the fourth place in our study, while it occupies the seventh place in the Moroccan Vascular Flora, the family of Poaceae, which occupies the sixth place in the region of Haouz-Rehamna, while it occupies the third place at the national scale, except two families Solanaceae and Rosaceae, which present a little distant classification between the local flora of the region of Haouz-Rehamna and that of Morocco.

These families are among the most important families of the Moroccan flora in terms of the number of genera and species (Fennane and Ibn Tattou 2012). Accordingly, these families of plants are well among those that provide the most plants to the traditional Moroccan pharmacopoeia; as an example, we cite:

Table 5

Comparison of the species richness of the prominent families of the medicinal flora of some regions of Morocco with the Moroccan vascular flora

Family	Rank and number of plant species					
	Our study area	Middle Central Atlas region (Hachi <i>et al.</i> 2022)	Rabat region (Hseini 2008)	Zaër region (Lahsis-sène <i>et al.</i> 2009)	Central Plateau region (El Hilah 2016)	Moroccan vascular flora (Fennane and Ibn Tattou 2012)
Asteraceae	1 (47)	1 (30)	1 (26)	2 (24)	2 (16)	1 (550)
Lamiaceae	2 (42)	2 (26)	4 (20)	3 (23)	1 (20)	6 (202)
Fabaceae	3 (35)	5 (13)	3 (23)	4 (15)	5 (08)	2 (424)
Apiaceae	4 (27)	3 (21)	2 (25)	1 (28)	3 (12)	7 (153)
Solanaceae	5 (18)	7 (08)	5 (14)	6 (11)	7 (5)	29 (15)
Poaceae	6 (16)	5 (13)	7 (10)	7 (10)	4 (09)	3 (355)
Rosaceae	7 (14)	4 (14)	6 (13)	7 (10)	6 (06)	13 (62)
Brassicaceae	8 (13)	7 (8)	11 (4)	8 (7)	7 (5)	4 (212)

Asteraceae constitute the most numerous angiosperms families, with 128 genera and about 550 species spread throughout Morocco (Fennane and Ibn Tattou 2012). Some species of the Asteraceae family are widely used as food plants on a national scale (Benkhnigue *et al.* 2023). However, *Achillea santolinoides*, *Achillea ageratum*, *Helichrysum italicum*, *Tanacetum vulgare* are used as aromatic plants, and *Carthamus tinctorius* is cultivated as a tinctorius plant.

The strong use of Lamiaceae in traditional medicine can be explained, on the one hand, by the fact that it is well known for its glandular hairs secreting essential oils, which are very important economically. Thus, this family is considered a source of renewable molecules that can be used in the pharmaceutical, phytosanitary, aroma and perfume fields (Cantino and Sanders 1986). On the other hand, this family includes many plants with biological and medical applications. The best-known genera of this family are a variety of aromatic spices such as *Lavandula*, *Mentha*, *Salvia*, *Thymus*, *Ocimum*, *Satureja*, *Rosmarinus*, *Hyssopus*, *Melissa* and others with more limited use (Bekut *et al.* 2018). Many genera in the Lamiaceae family are rich sources of glycosylated terpenoids, flavonoids, and iridoids (Gibbs 1974, Taskova *et al.* 1997).

The high representation of Fabaceae in this region can be explained by the fact that they are economically important as food, medicinal and culinary plants. In addition, it is well known for its nutrient-rich seeds (e.g., *Cicer arietinum*, *Lens culinaris*, *Trigonella foenum graecum*, *Pisum sativum*, *Arachis hypogaea*, *Phaseolus vulgaris* and *Vicia faba*) (Benkhnigue *et al.* 2022).

Apiaceae includes 53 genera and 153 species and occupies the seventh place in the vascular flora of Morocco (Fennane and Ibn Tattou 2012). Some species of Apiaceae are widely used as food and spices (e.g., *Ammodaucus leucotrichus*, *Apium graveolens*, *Coriandrum sativum*, *Daucus carota*, *Petroselinum sativum*, *Foeniculum vulgare*). Others, due to the presence of aromatic compounds in the leaves and fruits, are widely used for medicinal purposes (e.g., *Ridolfia segetum*, *Cuminum cyminum*, *Carum carvi*, *Visnaga daucoides*, *Ammi majus*, *Pimpinella anisum*) (Amer and Aly 2019, El Karkouri *et al.* 2023, Hajlaoui *et al.* 2021, Kamal *et al.* 2022, Mnif and Aifa 2015, Selim and Ouf 2012).

Solanaceae is intensely exploited by man, both for his food (e.g. *Solanum tuberosum* (potatoes), *Solanum lycopersicum* (tomatoes), *Solanum melongena* (eggplants)) and his health (alkaloids derived from tropane, extracts from *Atropa belladonna* (belladonna) or his pleasure (*Nicotiana tabacum*, ornamental plants such as *Brugmansia*, *Petunia*). This family contributes to the enrichment of modern medicine because it is rich in species that synthesise many molecules of therapeutic interest, such as tropane alkaloids such as atropine, scopolamine, and hyoscyamine; steroidal alkaloids such as solasodine and tomatidine; pyridine alkaloids; calysegines, polyhydroxylated nortropane

Table 6.
Classification of the
genus by the number
of medicinal species
used in the study area.

<i>Mentha</i>	8
<i>Lavandula</i>	6
<i>Artemisia</i>	6
<i>Thymus</i>	6
<i>Citrus</i>	6
<i>Solanum</i>	6
<i>Acacia</i>	5
<i>Satureja</i>	4
<i>Salvia</i>	4
<i>Brassica</i>	4
<i>Quercus</i>	4

type alkaloids and with anolides (Bekkouche *et al.* 2001, Dewick 2002, Kohnen-Johannsen and Kayser 2019, Wink 2003).

Genus richness of medicinal species used in the Haouz-Rehamna region

The analysis of Table 6 shows that the genus *Mentha*, belonging to the family Lamiaceae, is represented by eight species and occupies the first place in the region's medicinal flora. In comparison, it is in the 100th position with seven species in the Moroccan vascular flora. They are followed by *Lavandula*, *Artemisia*, *Thymus*, *Citrus*, and *Solanum*, with six species each. The genus *Acacia* occupies the 3rd place with five species, while *Satureja*, *Salvia*, *Quercus*, and *Brassica* come in 4th position with four species each.

Biological spectrum of the taxa encountered

The biological or ethological types reflect the life forms of the species during the bad season (Raunkiaer 1905). Their distinction is based on the buds' position that ensures the plant's continuity. The percentages of species belonging to each category of biological type composing a flora constitute the natural spectrum. According to Raunkiaer (1934), biological spectra are the expression of climates and, in general, of environments. The life form spectra of species recorded in the study area are presented in Table 7 compared to other studies.

The analysis of the data of Table 7 shows that the three biological spectra present rankings of almost the same order of magnitude with a slight modification. The biological spectra for all 411 species, whose biological types are known, show a clear dominance of therophytes that occupy the first place with 111 species (27%). The perennial species are well represented; they contribute to 72.76% of the total number of species recorded. Thus, phanerophytes come in second place with 23.36%, followed by geophytes with 14.60%. Chamaephytes are represented by 54 species (13.14%), hemicryptophytes occupy the fifth place with 51 species (12.41%), and nanophanerophytes are represented by 38 species (9.25%). In contrast, the hydrophytes are only represented by 0.24% (Table 7).

The strong presentation of therophyte species can be explained by the fact that they are annual species with short life cycles, most often adapted and favoured in frequently disturbed environments (Bouhache *et al.* 2002, Mail-

Table 7

Life form spectra of the recorded species in the study area according to Raunkiaer's (1934) classification and their comparison with different regions of Morocco (N = number)

Biological type	Haouz-Rehamna region		Zaire region (Lahsissène 2010)	Central Middle Atlas region (Hachi <i>et al.</i> 2022)
	Ranking (N of species)	Ranking (con- tribution%)	Ranking (con- tribution%)	Ranking (contri- bution%)
Therophytes	1 (111)	1 (27.00)	1 (25)	1 (26.02)
Phanerophytes	2 (96)	2 (23.36)	3 (16)	2 (18.37)
Geophytes	3 (60)	3 (14.60)	2 (20)	3 (15.31)
Chamaephytes	4(54)	4 (13.14)	4 (13)	4 (14.80)
Hemicryptophytes	5 (51)	5 (12.41)	6 (10)	5 (11.22)
Nanophanerophytes	6 (38)	6 (9.25)	5 (14)	6 (14.29)
Hydrophytes fixes	7(1)	7 (0.24)	7 (2)	7 (0)
Total	411	100	100	100

let 1992). According to Daget (1980) and Barbero *et al.* (1990), therophyly is a form of resistance to drought and high temperatures in arid environments.

In general, the excellent representativeness of therophytes in Morocco is underlined by regional studies on annual crops (Bouhache and Boulet 1984, Boulet *et al.* 1989, 1991, Loudyi 1987, 1995, Nègre 1961–1962) and also by ethnobotanical studies of medicinal plants (Benkhnigue *et al.* 2022, 2023, Hachi *et al.* 2022, Hseini 2008, Lahsissène 2010). The other four non-vascular species: *Homalathecium aureum*, *Hypnum cupressiforme*, *Evernia prunastri*, *Tirmania nivea*; the literature available so far does not give an accurate idea about the originalities and biological types of these species.

Hybrid species

The elaborated catalogue is characterised by the presence of 12 hybrid species attached to 5 botanical families with the dominance of the Lamiaceae family comprising five species (Table 8). The hybridisation of two species (*Mentha* sp. and *Origanum* sp.) will be a future publication project.

Systematic notes

The nomenclature adopted for plant taxa according to the International Plant Name Index (IPNI, <https://www.ipni.org/>) and other databases such as World Flora Online (WFO, <http://www.worldfloraonline.org/>) and Plants of

Table 8
List of hybrid species cited in the study area

Family	Species name	Vernacular name
Lamiaceae	<i>Mentha ×piperita</i>	Na'na el-âabdi
	<i>Mentha</i> sp.	Fliyou Ssaodi
	<i>Lavandula ×heterophylla</i>	Khezama Romiya
	<i>Origanum</i> sp.	Zaater Merdedouchi
	<i>Thymus ×citriodorus</i>	Zaitra Citroniya
Iridaceae	<i>Iris ×germanica</i>	Ssoussban
Musaceae	<i>Musa ×paradisiaca</i>	Elbanane
Rosaceae	<i>Fragaria ×vesca</i>	Fraize
	<i>Rosa ×centifolia</i>	El warde Beldi
Rutaceae	<i>Citrus ×aurantium</i> L.	Pamplemûsse
	<i>Citrus ×aurantium</i> f. <i>deliciosa</i>	Limoune
	<i>Citrus ×limon</i>	Elhamed

the world online (POWO, <https://powo.science.kew.org>) allowed us to update the nomenclature of 48 species, some of which are changed in genus while the others will shift in genus and species name (Table 9).

Ecological aspect

Medicinal and aromatic plants (MAP) have always been used by the man, who, over time, has developed experience as well as expertise in the traditional pharmacopoeia (Bellakhdar 2006, Benkhnigue *et al.* 2022, 2023). But, the overexploitation of national natural resources such as MAP currently represents a real danger to national biodiversity, especially the overexploitation practised in an anarchic and abusive manner and the lack of sufficient knowledge of the biology, taxonomy, and chorology of the exploited species (Fennane and Rejdali 2016). In this context, we have indicated the simplified ecology of the inventoried species and updated the data on the chorology to update and bring the necessary clarifications, both for its composition and the status of the taxa.

Geographical distribution of the recorded taxa

The geographical distribution of the medicinal flora of the Haouz-Rehamna region highlights the great originality of Middle Atlantic Morocco (Mam) with several taxa of 215, followed by the Rif (208 species), the High Atlas (202 species) and North Atlantic Morocco (193 species). At the same time, the other geographical divisions are represented by several taxa below 180.

Table 9

List of plants that have changed their nomenclature with the currently accepted names

Families	Previous scientific names	Names currently accepted
Amaryllidaceae	<i>Allium porrum</i> L.	<i>Allium ampeloprasum</i> L.
Amaranthaceae	<i>Fredolia aretioides</i> (Moq. et Coss. ex Bunge) Ulbr.	<i>Anabasis aretioides</i> Moq. et Coss. ex Bunge
Amaranthaceae	<i>Beta maritima</i> L.	<i>Beta vulgaris</i> L. subsp. <i>vulgaris</i>
Anacardiaceae	<i>Rhus pentaphylla</i> (Jacq.) Desf.	<i>Searsia pentaphylla</i> (Jacq.) F. A. Barkley ex Moffett
Anacardiaceae	<i>Rhus tripartita</i> DC.	<i>Searsia tripartita</i> (Ucria) Moffett
Apiaceae	<i>Ammi visnaga</i> (L.) Lam.	<i>Visnaga daucoides</i> Gaertn.
Apiaceae	<i>Elaeoselinum meoides</i> (Desf.) Koch ex DC.	<i>Thapsia meoides</i> (Desf.) Guss.
Apiaceae	<i>Petroselinum sativum</i> Hoffman.	<i>Petroselinum crispum</i> (Mill.) Fuss
Apocyanaceae	<i>Caralluma europaea</i> (Guss.) N. E. Br.	<i>Apteranthes europaea</i> (Guss.) Murb.
Asteraceae	<i>Carlina gummifera</i> (L.) Less.	<i>Chamaeleon gummifer</i> (L.) Cass.
Asteraceae	<i>Cynara scolymus</i> L.	<i>Cynara cardunculus</i> subsp. <i>scolymus</i> L.
Asteraceae	<i>Rhaponticum acaule</i> (L.) DC.	<i>Leuzea acaulis</i> (L.) Holub
Berberidaceae	<i>Berberis hispanica</i> Boiss et Reut.	<i>Berberis vulgaris</i> subsp. <i>australis</i> (Boiss.) Heywood
Brassicaceae	<i>Eruca sativa</i> Miller.	<i>Eruca vesicaria</i> (L.) Cav.
Brassicaceae	<i>Raphanus sativus</i> L.	<i>Raphanus raphanistrum</i> subsp. <i>sativus</i> (L.) Domin
Caryophyllaceae	<i>Spergularia maritima</i> (All.) Chiov.	<i>Spergularia media</i> (L.) C. Presl
Colchicaceae	<i>Androcymbium gramineum</i> (Cav.) MacBr.	<i>Colchicum gramineum</i> (Cav.) J. C. Manning et Vinn.
Cucurbitaceae	<i>Bryonia dioica</i> Jacq.	<i>Bryonia cretica</i> subsp. <i>dioica</i> (Jacq.) Tutin
Fabaceae	<i>Acacia albida</i> Delile	<i>Faidherbia albida</i> (Delile) A. Cheval.
Fabaceae	<i>Acacia gummifera</i> Willd.	<i>Vachellia gummifera</i> (Willd.) Kyal. et Boatwr.
Fabaceae	<i>Acacia nilotica</i> (L.) Willd. ex Delile	<i>Vachellia nilotica</i> (L.) P. J. H. Hurter et Mabb.
Fabaceae	<i>Acacia senegal</i> (L.) Willd.	<i>Vachellia tortilis</i> (Forssk.) Galasso et Banfi
Fabaceae	<i>Cassia absus</i> L.	<i>Chamaecrista absus</i> (L.) H. S. Irwin et Barneby

Table 9 (continued)

Families	Previous scientific names	Names currently accepted
Fabaceae	<i>Lens culinaris</i> Medik.	<i>Vicia lens</i> (L.) Coss. et Germ.
Fabaceae	<i>Pisum sativum</i> L.	<i>Lathyrus oleraceus</i> Lam.
Fabaceae	<i>Vigna sinensis</i> Endl. ex Hassk.	<i>Vigna unguiculata</i> subsp. <i>unguiculata</i> (L.) Walp.
Lamiaceae	<i>Lavandula</i> × <i>allardii</i> Hy.	<i>Lavandula</i> × <i>heterophylla</i> Viv
Lamiaceae	<i>Rosmarinus officinalis</i> var. <i>angustifolius</i> (Mill.) DC.	<i>Salvia rosmarinus</i> Spenn.
Lamiaceae	<i>Satureja atlantica</i> (Ball.) Maire	<i>Clinopodium atlanticum</i> (Ball) N. Galland
Lamiaceae	<i>Satureja nepeta</i> (L.) Scheele	<i>Clinopodium nepeta</i> (L.) Kuntze
Lamiaceae	<i>Satureja filiformis</i> Desf.	<i>Micromeria fontanesii</i> K. Koch.
Lauraceae	<i>Cinnamomum zeylanicum</i> Garcin ex Blume	<i>Cinnamomum verum</i> J. Presl
Lauraceae	<i>Persea gratissima</i> var. <i>oblonga</i> Meisn.	<i>Persea americana</i> Mill.
Myrtaceae	<i>Pimenta officinalis</i> Lindl.	<i>Pimenta dioica</i> (L.) Merr.
Paeoniaceae	<i>Paeonia mascula</i> subsp. <i>coriacea</i> (Boiss.) Malag.	<i>Paeonia coriacea</i> Boiss.
Poaceae	<i>Elytrigia repens</i> (L.) Nevski	<i>Elymus repens</i> (L.) Gould
Poaceae	<i>Pennisetum typhoides</i> (Burm.f.) Stapf et C. E. Hubb.	<i>Cenchrus americanus</i> (L.) Mor-rone
Poaceae	<i>Triticum durum</i> Desf.	<i>Triticum turgidum</i> subsp. <i>durum</i> (Desf.) Husn.
Polygonaceae	<i>Emex spinosa</i> (L.) Campd.	<i>Rumex spinosus</i> L.
Rosaceae	<i>Eriobotrya japonica</i> (Thunb.) Lindl.	<i>Rhaphiolepis bibas</i> (Lour.) Galasso et Banfi
Rosaceae	<i>Prunus dulcis</i> (Mill.) D. A. Webb	<i>Prunus amygdalus</i> Batsch
Rutaceae	<i>Citrus paradisi</i> Macfad	<i>Citrus</i> × <i>aurantium</i> L.
Rutaceae	<i>Citrus reticulata</i> Blanco.	<i>Citrus</i> × <i>aurantium</i> f. <i>deliciosa</i> (Ten.) M. Hiroe
Rutaceae	<i>Citrus</i> × <i>limetta</i> Risso var. <i>bergamia</i>	<i>Citrus</i> × <i>limon</i> (L.) Osbeck
Sapotaceae	<i>Argania spinosa</i> (L.) Skeels	<i>Sideroxylon spinosum</i> L.
Solanaceae	<i>Physalis alkekengi</i> L.	<i>Alkekengi officinarum</i> Moench
Solanaceae	<i>Solanum linnaeanum</i> Hepper et Jaeger	<i>Solanum anguivi</i> Lam.
Theaceae	<i>Camellia thea</i> var. <i>stricta</i> (Hayne) G. Watt.	<i>Camellia sinensis</i> (L.) Kuntze

Chorology

Throughout the world, habitat fragmentation is conceded to be the main cause of biodiversity loss. Thus, it is essential to know the distribution of exploited species to distribute the crops in their lands. The catalogue of Vascular Flora of Morocco (Fennane and Ibn Tattou 2005, Ibn Tattou and Fennane 2008) and the Synonymic index of the North African flora (Dobignard and Chatelain 2010–2013) constituted the basic references consulted to establish the chorology of the cited species. The distribution of taxa is given in Table 10.

Table 10 shows the dominance of Mediterranean, Asian and the European species. This result agrees with the one Braun-Blanquet and Maire (1924) obtained on the Moroccan flora, of which 2/3 are Mediterranean. This richness in Mediterranean elements often derives from evolutionary processes in situ by the disjunction of areas and formation of metapopulations, particularly in the environment or climate-imposing stress situations (Quézel 1995).

In addition, the colonisation of unoccupied ecological niches has allowed a noticeable acceleration of evolutionary processes, primarily through progressive speciation locally frequent in the Mediterranean region (Grime 1977, Stebbins and Major 1965).

Table 10

List of geographical origins of medicinal plants surveyed in the study area, their number of species, and their contribution

Geographical origins	Number of species	Contribution %
Mediterranean	196	47.37
Asian	181	43.72
European	161	38.89
African	70	16.91
Macaronesian	68	16.43
North African	49	11.84
American	41	9.9
Tropical	33	7.97
Eurasian	28	6.76
Subcosmopolitan and cosmopolitan	22	5.31
Near East	19	4.59
Saharan	17	4.11
Australian	17	4.11
Mauritanian-Iberian	11	2.66
Miscellaneous	56	13.51

Two major sets of causes can only explain the presence of such taxa in the Mediterranean flora:

Long-distance transport by wind and birds has played a major role in floristical migrations (Quézel 1995).

Climatic changes prove to be a major process of flora migration, not only in Europe on the occasion of the Plio-Pleistocene and Holocene cooling but also on the Mediterranean rim and the African continent, where the succession of dry and cool and wet and warm phases is nowadays admitted (Bonnefille 1983, Maly 1987) with variations of the average temperature of the order of 5 to 9 °C.

Essentially, the combined actions of climatic changes and long-distance transport best explain the establishment of floras today.

Bioclimatic stages

The medicinal species inventoried in this descriptive study belong to six bioclimatic stages (Saharan, arid, semi-arid, sub-humid, humid and high-mountain). Table 11 gives the distribution of these species according to their bioclimatic steps. Analysis of this shows a clear dominance of taxa belonging to the semi-arid bioclimatic stage with several species, followed by taxa living in the sub-humid, arid, humid and Saharan stages. High mountain is represented only by 8 species. These results are explained by the fact that the majority of the respondents have easy access to spontaneous plants living in their surroundings because the majority of the surveyed stations are located in the bioclimatic stages, sub-humid, arid, and semi-arid on the Emberger rain fall climagram (Emberger 1931, 1955).

Type of habitat and altitude of species collected in the field

The geographical diversity of the study area, which includes plains and feet of the High Atlas Mountains and the bioclimatic variety varied from arid

Table 11

Bioclimatic stage of medicinal plants used in the Haouz-Rehamna region

Bioclimatic stage	Number of species
Semi-arid	243
Sub-humid	215
Arid	172
Humid	126
Saharan	77
High mountain	8

climate to semi-arid and sub-humid, influence the repair of taxa in the various habitats (e.g., forest, farmland, matorral, steppe, clearing, fields, rock, pasture, stream, uncultivated places). These habitats, which contain flora from different biogeographical origins, lead to a very high specific richness (Table 12). Forests host the majority of medicinal species inventoried. At the same time, the other habitats are characterized by a low number of species ranging from 9 to 2.

Table 12

Habitat types of medicinal plants used in the Haouz-Rehamna region

Habitat types	Number of species
Forest	58
Matoral	53
Rock	51
Field	46
Pasture	34
Stream	27
Uncultivated place	26
Debris	25
Clearing	15
Sand and gravel	16
Hedge	13
Lawn and meadow	11

Table 13

Different types of altitude for medicinal plants identified in the study area

Altitude	Number of species
Low mountain	161
Plain	151
Middle mountain	102
High mountain	31

Table 14

The flowering period of medicinal species recorded in the study area

Flowering period	Number of species
Spring	295
Summer	245
Autumn	63
Winter	73

According to Table 13, there is a clear dominance of species living in low mountains (500–1,500 m) followed by the plains (less than 500 m), the medium mountains (1,500–2,500 m) high mountains (higher than 2,500 m) shelter only a small number of species.

Flowering period

Flowering is the biological process of flower development. It is controlled by the environment (light, humidity, temperature, etc.) and phytohormones. Table 14 shows that most of the species inventoried in the Haouz-Rehamna flower in spring. In contrast, the species flowering in winter and autumn are low.

CONCLUSIONS

The medicinal flora of the region of Haouz-Rehamna constitutes a significant floristical wealth. It is represented by 415 species, divided into 291 genera and belonging to 99 botanical families. These species are grouped in 7 systematic groups with a clear dominance of Angiosperms (87 families, 277 genera, and 397 species). Among the 99 families mentioned, we note the distinction of 9 families that are more used in the local medicinal flora and are the most widely represented in the Moroccan flora: Asteraceae, Lamiaceae, Fabaceae, Apiaceae, Solanaceae, Poaceae, Rosaceae, Brassicaceae and Cucurbitaceae. Of 291 genera, *Mentha* L. is the most used by its number of species (8).

In addition, we noted the use of 12 hybrid species namely: *Mentha* × *piperita*, *Lavandula* × *heterophylla*, *Thymus* × *citriodorus*, *Iris* × *germanica*, *Musa* × *paradisiaca*, *Fragaria* × *vesca*, *Rosa* × *centifolia*, *Citrus* × *aurantium* f. *deliciosa*, *Citrus* × *aurantium*, *Citrus* × *limon*. However, the hybridisation study of two remaining taxa: *Mentha* sp. and *Origanum* sp., including a genetic component, is in progress and will be the subject of a future publication. From the ethological point of view, the therophytes dominate the other biological forms with 27% of the global specific number, followed by the phanerophytes (23.36%). Concerning the chorology, the taxa with Mediterranean biogeographical repair dominate with 47.37%. The results of this study could serve as a drive and a database for future research in the field of floristics or ethnobotany.

*

Acknowledgements – Our sincere gratitude goes to all the botanical researchers of the Department of Botany and Plant Ecology of the Scientific Institute of Rabat, as well as to the anonymous reviewers and the academic editor who contributed significantly to the improvement of the text and also for their reading of our work and their helpful comments.

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Appendix

Checklist of the medicinal flora of Haouz-Rehamna region (Morocco) and their plant type, life form spectrum, flowering period, bioclimatic stage, chorology, habitat and ecology

PHYLUM (no. of species) and families	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
I. LICHENS (1)						
Parmeliaceae (1)						
<i>Evernia prunastri</i> (L.) Ach.	Spo				N Afr; Midd E; Medit orientale	
II. HIGHER MUSHROOMS (1)						
Pezizaceae (1)						
<i>Terfezia ovalispora</i> Pat.	Spo					
III. BRYOPHYTES (2)						
Brachytheciaceae (1)						
<i>Homalothecium aureum</i> (Spruce) H. Robinson	Spo					
Hypnaceae (1)						
<i>Hypnum cupressiforme</i> Hedw.	Spo					
IV. PTERIDOPHYTES (3)						
Dryopteridaceae (1)						
<i>Dryopteris filix-mas</i> L.	Spo	G	Sp; Su	SH; H	Temperate zones of the N hemisphere; India; Andes	Moist soil, slightly humusy and a little calcareous
Equisetaceae (2)						
<i>Equisetum ramosissimum</i> Desf.	Spo	G	Wi; Sp	S; A; SA; SH; H	Subcos	Wet sandy places, riversides and irrigation channels (seguias); plains and mountains up to 1,900 m
<i>Equisetum telmateia</i> Ehrh.	Spo	G	Wi; Sp	SH; H	Medit; Mac; C & merid Eur; SW Asia; N Afr & Ame	Very wet shady places, edges of streams and marshes

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
Peridaceae (1)						
<i>Adiantum capillus-veneris</i> L.	Spo	G	Sp; Su	S; A; SA; SH; H	Trop; subtropical and temperate regions	Caves and wet oozing rocks, edges of springs and streams; plains and mountains, up to 1,800 m
V. GYMNOSPERMS (4)						
Cupressaceae (4)						
<i>Cupressus atlantica</i> Gaussen	Spo	Ph	Sp	SA; SH	Strict endemic of Morocco	Low and medium mountains
<i>Juniperus oxycedrus</i> L.	Spo	Ph	Wi; Sp	SA; SH; H	W Medit; Mad; S Eur; W Asia	Forests and matorrals; plains and mountains
<i>Juniperus phoenicea</i> L.	Spo	Ph	Sp	A; SA; SH	Medit; Mac	Plains, low and medium mountains
<i>Tetractinis articulata</i> (Vahl.) Masters	Spo	Ph	Su	SA; SH	S Spa; Malta; Alg; Tun; Lib; Cyp	Plains, low (and medium) mountains
Ginkgoaceae (1)						
<i>Ginkgo biloba</i> L.	Imp	Ph	Sp; Su		Native to: China South-east. Int into: China N-C; China S-C; Illinois; Japan; Korea; Romania	
Pinaceae (2)						
<i>Cedrus libani</i> A. Richard subsp. <i>atlantica</i> (Endl.) Batt. et Trab.	Spo and Cul	Ph	Wi	SH; H	N Afr; Alg	Low and medium mountains
<i>Pinus halepensis</i> Mill.	Spo and Cul	Ph	Sp	SA; SH	Medit region	Open forests; plains, low and medium mountains
Taxaceae (1)						
<i>Taxus baccata</i> L.	Spo	Ph	Sp	H	Alg; Eur; W Asia	Shaded ravines and forests of the medium mountains
VI. CHLAMYDOSPERMES (1)						
Ephedraceae (2)						
<i>Ephedra altissima</i> Desf.	Spo	Ph	Wi; Sp	S; A; SA; S	Can Is; Alg; Tun; Tripolitania	Forests, scrub, hedges, rocks; plains, low and medium mountains

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Ephedra fragilis</i> Desf.	Spo	Nph	Sp	SA; S	Medit Occid & C; Mac	Arid rocks, coastal dunes, and low and medium mountains
VIL. ANGIOSPERMAE						
MONOCOTYLEDONAE (15)						
Amaryllidaceae (3)						
<i>Allium cepa</i> L.	Cul	G	Su		Native to Turkmenistan. Introduced worldwide	
<i>Allium ampeloprasum</i> L.	Cul	G	Sp; Su		Eur and widely cultivated in all temperate zones	Crops, cultivated fields, scrub, rocky or sandy pastures of the plain and the mountains, up to 1,900 m
<i>Allium sativum</i> L.	Cul	G	Sp; Su		Central Asia	
Araceae (1)						
<i>Arium italicum</i> Mill.	Spo	G	Sp; Su	A; SA; SH; H	W Medit; Mac; W Eur; Asia Minor	Scrub, hedges, damp shady places; nitrophilous; plains and low mountains
Arecaceae (3)						
<i>Chamaerops humilis</i> L.	Spo	Ph	Sp; Su	A; SA; SH	W & Medit center	Matorrals, farms; plains, low and medium mountains
<i>Cocos nucifera</i> L.	Imp	Ph	Wi; Sp; Su; Au		The Indian Ocean, Afr and Ame	Sandy and well-drained soils
<i>Phoenix dactylifera</i> L.	Cul and Subsp	Ph	Sp	S; A	Ara Pen to S Pak; N. Afr and SW Asia	Saharan and arid rivers and oases
Asparagaceae (4)						
<i>Agave americana</i> L.	Spo	Hem	Su	A; SA; SH	C Ame; Medit and Mac	
<i>Asparagus albus</i> L.	Spo	Nph	Su; Au	SA; SH	Western and C Medit; Can Is	Steppes, scrub, open forests, rocks, plains and low mountains
<i>Asparagus horridus</i> L.	Spo	Nph	Wi; Sp; Su; Au	S; A; SA; SH	Medit; Ara Pen; Mac	Steppes, poor or sandy places; plains, low and medium mountains
<i>Drimys maritima</i> (L.) Stearn	Spo	G	Su; A; Wi	A; SA; SH; H	W & Medit Center	Glades, meadows, ruderal environments, rocks, rock gardens, plains, and low and medium mountains

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
Bromeliaceae (1)						
<i>Ananas comosus</i> (L.) Merr.	Imp	Ch	Su		Brazil and Paraguay	Neutral soil mixed with sand and loam
Costaceae (1)						
<i>Costus</i> sp.	Imp	G	Wi; Sp; Su; Au		Tropical regions	
Colchicaceae (2)						
<i>Colchicum gramineum</i> (Cav.) J. C. Manning et Vinn.	Spo	G	Au	S; A; SA	Alg; Tun; Mau; Can Is; S Spa	Sandy meadows, arid and desert pastures, plains and low mountains
<i>Colchicum lusitanum</i> Brot.	Spo	G	Au	SA; SH; H	W & Medit Center	Plains and mountains
Cyperaceae (3)						
<i>Bolboschoenus maritimus</i> (L.) Palla	Spo	G	Au; Su; Sp; Wi	A; SA; SH	Temperate and sub-tropical regions	Edges of fresh and brackish water, Dayas; plains, low and medium mountains
<i>Cyperus esculentus</i> L.	Imp	G	Su; Au		Subtropical	Cool, light, sandy, humusy and drained soil
<i>Cyperus rotundus</i> L. subsp. <i>rotundus</i>	Spo	G	Wi; Sp; Su; Au	SA; SH	Cosm	Irrigated crops, sandy wadi beds
Dioscoreaceae (1)						
<i>Dioscorea communis</i> (L.) Caddick et Wilkin	Spo	G	Wi; Sp; Su	A; SA; SH; H	Medit; W Eur; W Asia	Matorrals, forests, fresh places, plains, low (and middle) mountains
Iridaceae (2)						
<i>Crocus sativus</i> L.	Cul	G	Su; Au		Eur Orient	Well-drained soil (which allows rainwater to filter out quickly)
<i>Iris</i> × <i>germanica</i> L.	Cul and Nat	G	Wi; Sp; Su; Au		Balkan Peninsula, cultivated elsewhere.	Rocks, crops, cultivated or uncultivated fields of the plain, walls and hillsides
Juncaceae (1)						
<i>Juncus rigidus</i> Desf.	Spo	Hem	Sp; Su	S; A; SA; SH; H	Medit; Azores; tropical and southern Afr; Eur; Asia to Pak. Introduced to N Ame	Halophilous, hygrophilous; maritime sands, brackish marshes, humid salty soils; plains, low and medium mountains

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
Musaceae (1)						
<i>Musa × paradisiaca</i> L.	Cul	Ph	Su		Afr; Ame	Rich, humusy, calm, drained soil; mild to warm climate
Poaceae (16)						
<i>Avena sativa</i> L.	Cul	Th	Sp		Temperate regions	
<i>Castellia tuberculosa</i> (Moris) Bor.	Spo	Th	Sp; Su	A; SA	W Medit; Can Is; Sardinia; Greece; Cyr; S and SW Asia	Matorrals, grasslands, steppes, stony and sandy soils; plains, low and medium mountains
<i>Cenchrus americanus</i> (L.) Morrone	Cul	Th	Sp; Su			
<i>Cymbopogon schoenanthus</i> (L.) Spreng.	Spo	Hem	Wi; Sp; Su	S; A; SA	Saharo-Sindian and Sudano-Decadain regions	Steppes, rocks, rocky pastures; plains and low mountains
<i>Cymbopogon citratus</i> (DC.) Stapf	Cul	Hem	Su		Asia (Malaysia, South India)	Sandy and soil rich, fresh, rather humusy and sunny
<i>Cynodon dactylon</i> (L.) Pers.	Spo	G	Au; Wi; Sp; Su	S; A; SA; SH; H	Afr; Eur; Asia. Naturalized in Ame and Australi	Matorrals, farms, crops, grasslands, temporary pools, coastal sands, plains and low mountains
<i>Elymus repens</i> (L.) Gould	Spo	G	P; Su	A; SA; SH	Medit; Mac; Eur; Asia; N Ame	Matorrals, fields, wastelands; plains and low mountains
<i>Hordeum vulgare</i> L.	Cul	Th	Sp		Ame	
<i>Oryza sativa</i> L.	Cul	Th	Su		Asia	
<i>Panicum miliaceum</i> L.	Cul and Subsp	Th	Su; Au		Origin unknown. Cultivated and subsumed in temperate and warm regions of the world	
<i>Phalaris canariensis</i> L.	Cul and Subsp	Th	Sp; Su	SA; SH	Can Is; Mad; Mac; Medit; Eur and Asia	Harvest and crops
<i>Poa bulbosa</i> L. subsp. <i>bulbosa</i>	Spo	Hem	Wi; Sp; Su	A; SA; SH; H	Medit; Mac; Eur; W and S Asia. Int in N Ame	Pastures, wastelands, rocks, plains and mountains

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Spo	G	Su; Au	S; A; SA; SH; H	Temperate regions of the world	Watersides, marshes, and ditches
<i>Saccharum officinarum</i> L.	Cul	G	Au		Ame; Asia	Ordinary soil, humus, fresh. Belching plant (does not support the frost)
<i>Triticum turgidum</i> subsp. <i>durum</i> (Desf.) Husn.	Cul	Th	Su		Eur; Ame	
<i>Zea mays</i> L.	Cul	Th	Su		Ame	
Xanthorrhoeaceae (3)						
<i>Aloe soccotrina</i> Weston	Cul	Ch			Afr; Madagascar and Asia	
<i>Asphodelus ramosus</i> L.	Spo	G	Au; Sp; Su	A; SA; SH; H	Medit; Can Is; Mac; S Eur; W Asia	Forest clearings, matorrals, farms, overgrazed areas, plains, low and medium mountains
<i>Asphodelus tenuifolius</i> Cav.	Spo	Th	Au; Sp; Su	S; A; SA	Medit; Mac; S Eur; Sahara; W & S Asia	Steppes, coastal sands, roadsides, crops, plains, low (and medium) mountains
Zingiberaceae (5)						
<i>Alpinia officinarum</i> Hance	Imp	G	Su; Au		Tropical Asia	Humid, rich and draining
<i>Aframomum melegueta</i> K. Schum.	Imp	G			W Afr. Introduced into French Guiana, Guyana, Trinidad-Tobago, Windward Is	Drained, humid, humus
<i>Curcuma longa</i> L.	Imp	G	Su		Native to India and Malaysia	Rich, humusy, deep, fresh and light. A good potting soil with some river sand will do the trick in pots
<i>Elettaria cardamomum</i> (L.) Maton.	Imp	G	Au; Wi; Sp; Su		Native to India	
<i>Zingiber officinale</i> Rosc.	Imp	G	Su		Native to India	
VIII. ANGIOSPERMAE						
DICOTYLEDONAE (72)						
Actinidiaceae (1)						

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Actinidia chinensis</i> Planch.	Imp	Ph	Sp; Su		Native to: China N-C, China S-C, China SE	
Aizoaceae (2)						
<i>Aizoon canariense</i> L.	Spo	Th	Wi; Sp	S; A	Mac; N Afr; Sinai; Pal; Arabia; India; Aus	Coastline and steppes
<i>Mesembryanthemum nodiflorum</i> L.	Spo	Th	Wi; Sp	S; A; SA	Medit; Can Is; Mad; W Asia; Southern Afr	Coastline, steppes and mostly salt marshes; plains and low mountains
Amaranthaceae (8)						
<i>Atriplex halimus</i> L.	Spo	Nph	Sp; Su; Au	S; A; SA; SA; SH	Medit; Mac; S Afr; W Asia	Sea sands, pastures and salt grounds
<i>Beta vulgaris</i> L. subsp. <i>vulgaris</i>	Spo	Th	Sp	A; SA; SH	Medit; Mac; Eur; Western and C Asia	Sea rocks, rubble, meadows, uncultivated fields, plains, low and medium mountains
<i>Beta vulgaris</i> L.	Cul	Th			Medit; Mac; Eur; Western and Central Asia	
<i>Chenopodium album</i> L.	Spo	Th	Sp; Su; Au	S; A; SA; SH; H	Subcos, especially in the northern hemisphere	Fields, paths, feet of walls, nitrophilous
<i>Chenopodium ambrosioides</i> L.	Nat	Th	Sp; Su; Au	A; SA; SH	Trop; Ame; Intro elsewhere in the tropics and subtropics	Fresh wasteland, ditches, hedges, sandy alluvium
<i>Chenopodium quinoa</i> Will.	Cul	Th	Au; Wi		South Ame	Well-drained soil, rich in humus, fresh and used to dry periods
<i>Anabasis aretioides</i> Moq. et Coss. ex Bunge	Spo	Ch	Au	S	Alg; Mau	Desert steppe
<i>Spinacia oleracea</i> L.	Cul	Th	Wi; Sp		Native to SW Asia; Advrt and Nat in Medit	Cultivated, sometimes spontaneous, on rubble
Anacardiaceae (6)						
<i>Mangifera indica</i> L.	Imp	Ph	Sp; Su		S Asia; Eastern India and Burma, Intro in Afr and Brazil and cultivated in all tropical countries	Suitable for all soils but prefers deep, humusy, drained, loamy and excellent soils

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Pistacia atlantica</i> Desf.	Spo	Ph	Sp; Su	A; SA; SH	Medit meridian; Can Is; Cyp; Hoggar	Plains, low and medium mountains
<i>Pistacia lentiscus</i> L.	Spo	Ph	Sp	SA; SH; H	Medit; Can Is; W Asia	Plains, low (and medium) mountains
<i>Pistacia terebinthus</i> L.	Spo	Ph	Sp	SA; SH	Medit	Low and medium mountains
<i>Searsia pentaphylla</i> (Jacq.) F. A. Barkley ex Moffett	Spo	Nph	Sp	S; A; SA	Alg; Tun; Sicily	Plains and low mountains
<i>Searsia tripartita</i> (Ucria) Moffett	Spo	Nph	Sp	S; A; SA	Saharo-Medit	
Annonaceae (1)						
<i>Xylopia aethiopica</i> (Dunal.) A. Rich.	Imp	Ph			Tropical Afr	Forest edges, forest galleries and scrub
Apiaceae (27)						
<i>Ammi majus</i> L.	Spo	Th	Sp	SA; SA; SH; H	Medit; Mac; S Eur; Western and C Asia	Matorrals, farms, fields, plains and low mountains
<i>Ammodaucus leucotrichus</i> Coss.	Spo and Cul	Th	Sp	S; A	Can Is; Sahara	Desert sands, river gravels
<i>Ammoides pusilla</i> (Brot.) Breistr.	Spo	Th	Sp; Su	A; SA; SH	Medit region	Rocky and clayey hillsides, plains and low mountains
<i>Anethum graveolens</i> L.	Spo and Cul	Th	Sp; Su	A; SA; SH	Cul and widely nat in the Medit; Mac	Rocks of the low mountains
<i>Apium graveolens</i> L.	Cul	Th	Sp; Su; Au	A; SA; SH	Medit; Mac; C and S Eur; W Asia	Marshes and water edges of the plains
<i>Athamantia sicula</i> L.	Spo	Hem	Sp	A; SA; SH	Alg; Tun; Southern Italy; Sicily	Arid limestone rocks of plains and low mountains
<i>Carum carvi</i> L.	Cul	Th	Sp; Su		Eur; Siberia; Caucase; Perse; Thibet	Meadows and woods, mostly mountainous
<i>Conium maculatum</i> L.	Spo	Th	Sp	A; SA; SH; H	Medit Occid; Mac; Eur; Western Asia	
<i>Coriandrum sativum</i> L.	Cul	Th	Sp; Su		Medit	
<i>Cuminum cyminum</i> L.	Cul and Subsp	Th	Sp		Est Medit	

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Daucus carota</i> L.	Cul	Th	Sp; Su	A; SA; SH; H	Medit; Mac; Eth; Eur; occident & centrale Asia	Plains, low and medium mountains
<i>Daucus crinitus</i> Desf.	Spo	G.	Sp; Su	A; SA; SH; H	Alg; Tun; Ibe Pen	Plains and low mountains
<i>Eryngium ilicifolium</i> Lamk.	Spo	Th	Su	A; SA; SH; H	Southern Spa; Alg; Tun	Rocky glades of dry forests, steppes, and desert pastures
<i>Eryngium tricuspidatum</i> L.	Spo	Hem	Su	A; SA; SH; H	Alg; Tun; Southern Spa; Sardinia; Sicily	Rocky pastures, forest clearings, crops, plains, and low and medium mountains
<i>Ferula assa-foetida</i> L.	Imp	G	Sp; Su		Native to Iran. Naturalized in several temperate regions of Asia	
<i>Ferula communis</i> L.	Spo	G	Sp; Su	A; SA; SH; H	Alg; Tun; Cyr; Eur merid; Western Asia	Plains, low and medium mountains
<i>Foeniculum vulgare</i> Mill.	Spo	Ch	Sp; Su	A; SA; SH; H	Medit; Mac; C and Southern Eur; Western Asia	Uncultivated fields, dry hillsides, ravines, rocks, plains and low mountains
<i>Kundmannia sicula</i> (L.) DC.	Spo	G	Sp	SA; SH; H	Western Medit	Open forests, matorrals, ermes, sandy and clay soils, plains and low mountains
<i>Meum athamanticum</i> Jacq.	Spo	Hem	Sp	S.A.	Eur	Wet grasslands, stream banks, siliceous mountains
<i>Magdalis panicifolia</i> (Vahl) Lange	Spo	G	Su	SH; H	Alg; Tun; Portugal; Spa	Open forests and matorrals of low and medium mountains
<i>Petroselinum crispum</i> (Mill.) Fuss	Cul	Th	Su		South-west Asia; N Afr and Mac	
<i>Pimpinella anisum</i> L.	Cul	Th	Su		E of the Medit basin	
<i>Ridolfia segetum</i> (Guss.) Moris	Spo	Th	Sp; Su	A; SA; SH; H	Medit; Mac; Western Asia	Crops, uncultivated fields, plains and low mountains
<i>Smyrnium olusatrum</i> L.	Spo	G	Wi; Sp	SA; SH; H	Western Medit; Can Is; Western and Southern Eur	Forests, hedges, shady places, plains, low and medium mountains
<i>Thapsia meoides</i> (Desf.) Guss.	Spo	G	Sp; Su	SA; SH; H	Alge; Tun; Sardinia; Sicily; S Italy; Tripolitania	Open forests, sandy and rocky pastures; plains, low and medium mountains

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<i>Thapsia transtagnia</i> Brot.	Spo	G	Sp	A; SA; SH; H	Alg; Ibe Pen	Forest clearings, sandy and rocky fields, steppes, plains and low mountains
<i>Visnaga daucooides</i> Gaertn.	Spo	Th	Sp; Su	A; SA; SH; H	Medit; Mac; W Asia. Int in Eur and Ame	Fallow and crops on clay soils
Apocyanaceae (2)						
<i>Apteranthes europaea</i> (Cuss.) Murb.	Spo	Ch	A; W	A; SA; SH	Medit	Rocky places, matorrals of plains and medium mountains
<i>Nerium oleander</i> L.	Spo	Nph	Sp; Su	S; A; SA; SH; H	Medit; S Eur; W Asia	Oued banks up to 2,000 m
Araliaceae (1)						
<i>Panax ginseng</i> C. A. Mey.	Imp	Ph	Sp; Su		Asia	Soil: sandy, well-drained, rich in humus
Aristolochiaceae (1)						
<i>Aristolochia paucifloris</i> Pomel	Spo	G	Sp	SA; SH; H	Medit occid; Mac	Fields, farms, matorrals; stony, clayey or sandy soil; plains, low and medium mountains
Asteraceae (47)						
<i>Achillea ageratum</i> L.	Spo	Hem	Sp; Su	SA; SH	Northwestern Medit	Stream banks, slightly humid clay pastures, and low and medium mountains
<i>Achillea odorata</i> L.	Spo	Hem	Sp; Su	SA; SH	Alg; Spa; France	Open forests, dry grasslands, and low and medium mountains
<i>Achillea santolinoides</i> Lag.	Spo	Ch	Sp; Su	A; SA	N Afr; Spa; Aze; Arm; Ana; Near East; Ibe-Mau	Clayey fields a little wet, edges of the seguias
<i>Anacyclus maroccanus</i> (Ball) Bail.	Spo	Th		S; A; SA; SH	Strict endemic of Morocco	Open forests, steppes, dry stony fields, plains and low mountains
<i>Anacyclus pyrethrum</i> L.	Spo	Hem	Sp; Su	SA; SH; H; H	Alg; Spa	Forest clearings, matorrals, farms, pastures; (plains), low, medium and high mountains
<i>Anacyclus radiatus</i> Loisel.	Spo	Th	Wi; Sp; Su	A; SA; SH; H	Western Medit; Can Is; Libya	Old walls, forest clearings, sandy, stony and clayey pastures, plains and low mountains
<i>Anvillea garcinii</i> (Burm. f.) D. C. subsp. <i>radiata</i> (Coss. et Dur.) Anderb.	Spo	Ch	Sp	S; A	Alg; Tun; Libya; Egy; Endemic to Sahara	Sub-desert rocky outcrops, siliceous rocky outcrops and sandy-loamy wadis

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<i>Argyranthemum frutescens</i> (L.) Sch. Bip.	Cul	Ph	Sp; Su		Can Is	Calcareous, sandy and stony soil
<i>Artemisia absinthium</i> L.	Spo, Cul or Nat	Ch	Su; Au	SA; SH	Alg; Eur; W and C Asia	Forests and clear matorrals on little stony soils, medium mountains
<i>Artemisia atlantica</i> Coss et Dur. var. <i>maroccana</i> (Coss) Maire.	Spo	Ch	Su; Au	SA; SH; HM	Alg; Tun	Open forests, stony slopes, rocky outcrops, medium mountains
<i>Artemisia campestris</i> L.	Spo	Ch	Su; Au	A; SA; SH	Medit; Eur; W Asia	Rocky pastures; medium and high mountains
<i>Artemisia herba alba</i> Asso	Spo	Ch	Su; Au	S; A; SA	Spa and France	Steppes and rocky pastures
<i>Artemisia huguetii</i> Caball.	Spo	Ch			Strict endemic of Morocco	
<i>Artemisia mesallantica</i> Maire	Spo	Ch	Su; Au	SA; SH; H	Strict endemic of Morocco	Clay steppes, rocky pastures of low and medium mountains
<i>Calendula stellata</i> Cav.	Spo	Th	Wi; Sp; Su		Alg; Tun; Sicily; Can Is	Ruderal plant
<i>Chamaeleon gummiifer</i> (L.) Cass.	Spo	Hem	Su; A	A; SA; SH	Western and Northern Medit	Open matorrals, rangelands, wastelands; exceedingly soft and deep soils; plains and low mountains
<i>Carlina brachylepis</i> (Batt.) Meusel et Kastner	Spo	Hem	Sp; Su; Au	S; A; SA; SH	Alg	Matorrals, rocky fields, steppes, plains, low and medium mountains
<i>Carthamus tinctorius</i> L.	Cul as a tinc- torius plant	Th	Su		Medit	
<i>Catananche caerulea</i> L.	Spo	G	Sp; Su	A; SA; SH; H	Western Medit; Libya	Degraded forests, matorrals, ermes, plains, low and medium mountains
<i>Chamaemelum nobile</i> (L.) All.	Spo	Th	Sp; Su	SH	Alg; Western Eur; Mac	Ermes, grasslands, nitrophilous; low and medium mountains
<i>Centaurea calcitrapa</i> L.	Spo	Th	Sp; Su	A; SA; SH; H	Medit; C Eur; W Asia; Mad; Can; Alg; Tun; Egy	Earthy pastures, crops, field edges, wasteland, rubble, plains, low and medium mountains
<i>Centaurea maroccana</i> Ball.	Spo	Th	Wi; Sp	S; A; SA	Alg; Libya; Spa	Fields, arid pastures, plains and low mountains

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Glebionia coronaria</i> (L.) Cass. ex Spach	Spo	Th	Wi; Sp	A; SA; SH; H	Spa; Italy; Dalmatia; Greece; Afr N	Fields, sandy and clay pastures, plains and low mountains
<i>Cichorium intybus</i> L.	Spo	Hem	Sp; Su	SA; SH; H	Medit; Eur; Asia; Alg; Tun	Red chestnut and tansy soils; red-brown soils, uncultivated pastures and fields; low and medium mountains
<i>Cladanthus arabicus</i> (L.) Cass.	Spo	Th	Sp; Su	A; SA; SH	Alg; Tun; Libya; Spa; Malta	Grasslands, crops, pastures, plains, low and medium mountains
<i>Cynara cardunculus</i> L. subsp. <i>flavescens</i> Wiklund	Cul and Subsp	G	Sp; Su	A; SA; SH	Western Medit; Alg; Tun; Lib	Uncultivated pastures and fields, especially in clay soils, plains and low mountains
<i>Cynara humilis</i> L.	Spo	G	Sp; Su	A; SA; SH; H	Alg; Ibe Pen	Pastures of calcareous, siliceous, clayey and sandy grounds; plains and low mountains
<i>Cynara cardunculus</i> subsp. <i>scolymus</i> L.	Cul for food	G	Su; Au		Alg; Tun; Libya	
<i>Dittrichia viscosa</i> (L.) Greuter	Spo	Ch	Su; Au	A; SA; SH; H	Medit; Southern Eur; Mac; Near East	Open environments on sufficiently humid clayey substrates, water edges, plains and low mountains
<i>Echinops spinosissimus</i> Turra	Spo	Hem	Sp; Su; Au		South; East and North-East Medit; Near East	Degraded matorrals, steppes, uncultivated places, plains, low and medium mountains
<i>Helianthus annuus</i> L.	Cul and Nat	Th	Sp; Su	SA	Medit; Eur; Asia and elsewhere	Plains and low mountains
<i>Helichrysum italicum</i> (Roth.) G. Don.	Cul and Spo	Ch	Sp; Su; Au	SH	Alg; Tun; Northern Medit	
<i>Kleinia anteauphorbium</i> (L.) DC.	Spo	Nph	Wi; Sp; Su	A; SA	Strict endemic of Morocco	Matorrals, steppes, regs and superficial sands; plains and low mountains
<i>Lactuca sativa</i> L.	Cul	Th	Su			
<i>Lactuca virosa</i> L.	Spo	Th	Su; A	SH; H	Alg; Eur	Matorrals, farms, crops, cool places; low and medium mountains
<i>Launaea arborescens</i> (Batt.) Murb.	Spo	Nph	Sp; Su; Au	S; A; SA	Alg; Mac; Spa; Mad; Bal Is; Ibe-Mau	Steppes, arid rocklands, overgrazed areas, plains, low (and medium) mountains
<i>Matricaria chamomilla</i> L.	Nat	Th	Wi; Sp; Su	SA; SH	Medit; Mac; Eur; Asia	Crops, uncultivated fields, gardens

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Pallenis spinosa</i> (L.) Cass.	Spo	Hem	Wi; Sp; Su	A; SA; SH; H	Medit; Can Is; Near East; Anatolia; Iran	Open forests, matorrals, meadows, pastures, plains, and low and medium mountains
<i>Leuzea acaulis</i> (L.) Holub	Spo	Hem	Sp; Su	A; SA; SH; H	Alge; Tun; Lib	Glades, farms and pastures on primarily sandy soils; plains, low and medium mountains
<i>Scolymus hispanicus</i> L.	Spo	Hem	Sp; Su	S; A; SA; SH; H	Medit; Mac; S Eur; W and SW Asia	Matorrals, pastures, crops, plains, low and medium mountains
<i>Senecio vulgaris</i> L.	Spo	Th.	Wi; Su; Au; Sp	A; SA; SH; H	Subcos	Open forests, stony pastures, crops, plains and mountains
<i>Sonchus oleraceus</i> L.	Spo	Th	Wi; Sp; Su; Au	S; A; SA; SH; H	Cosm	Crops, ruderal environments, abandoned lands, plains, low and medium mountains
<i>Stevia rebaudiana</i> (Bertoni) Bertoni	Cul	Ch	Su		Northern Same (Brazil and Paraguay)	Acidic and drained soil tolerates poor, non-dry soils
<i>Tanacetum parthenium</i> (L.) Sch. Bip.	Cul and Subsp	Hem	Sp; Su		Medit; Eur and Asia	Fields, rubble, hedges
<i>Tanacetum vulgare</i> L.	Cul	Hem			Eur; Siberia; lacks in part of the Medit region	Uncultivated places, roadsides, and rivers in all of France
<i>Taraxacum atlanticum</i> Pomel	Spo	Hem	Sp; Su	SA; SH; H; HM	Alg	Wet pastures; medium and high mountains
<i>Warionia Sahara</i> Benth et Coss.	Spo	Nph	Sp; Su	S; A; SA	Alg	Rocky substrate; plains and low mountains
Berberidaceae (1)						
<i>Berberis vulgaris</i> subsp. <i>australis</i> (Boiss.) Heywood	Spo	Nph	Sp; Su	SA; SH; H	Alg; Ibe Pen	Forests, matorrals, cracks in mountain rocks, 1,600–3,200 m
Botaginaceae (1)						
<i>Echium horridum</i> Batt.	Spo	Th	W; Sp	S; A; SA; SA	Sahara; S Medit; Mau; Mar; Alg; Tun; Lib; Egy	Rocks, rockeries, plains and low mountains
Brassicaceae (13)						
<i>Anastatica hierochuntica</i> L.	Spo	Th	W; Sp	S; A	Sahara; Sahel; Near East; Arabia; Iran; Pak	Clay and stony steppes
<i>Brassica oleracea</i> var. <i>capitata</i> L.	Cul	Th	Sp; Su		Eur	Humus soil, deep, fresh and drained
<i>Brassica oleracea</i> L. var. <i>ramosa</i> (DC.) Alefeld	Cul	Th	Sp; Su		Eur	

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Brassica rapa</i> L.	Cul	Th	Sp; Su		Native; Advt; Nat; Or Dout in Medit	
<i>Brassica rapa</i> L. var. <i>rapa</i>	Cul	Th	Sp; Su		Eur	
<i>Capsella bursa-pastoris</i> (L.) Medik.	Spo	Th	Wi; Su; Au; Sp	All bioclimates	Cosm	Nitrophilous; plains, low and medium mountains
<i>Diplotaxis harra</i> (Forsskal) Boiss.	Spo	Hem	Wi; Sp; Su	S; A; SA	Medit meridian; Spa; Sicily; Western Asia	Rocks and rockeries, torrent beds
<i>Diplotaxis pitaridiana</i> Maire	Spo	Th	Wi; Sp; and after the rains	S; A	Alg; Mau	Sandy and gravelly soils; desert streambeds
<i>Eruca vesicaria</i> (L.) Cav.	Spo	Th	Sp; Su	S; A; SA	Medit; Can Is; Mad; C Eur; Occid and C Asia; Aby	
<i>Lepidium sativum</i> L.	Cul and Subspo	Th	Wi; Su; Au; Sp		Egy; Ana; Pal; Jor; Widely Nat elsewhere	Around the houses
<i>Nasturtium officinale</i> W. T. Aiton	Spo and Cul	HyF	Sp	A; SA; SH	Cosm	Streams, springs, marshy meadows of plains and mountains
<i>Raphanus raphanistrum</i> subsp. <i>sativus</i> (L.) Domin	Cul and Subsp	Th	Sp; Su		Native to Eurasia. Int in all regions of the world	
<i>Sinapis alba</i> L.	Spo	Th	Sp; Su	A; SA; SH	Medit; Mac; Eur; W Asia	Matorrals, farms, crops, rocks and rubble; plains, low and medium mountains
Butseraceae (2)						
<i>Boswellia sacra</i> Flueck.	Imp	Ph	Su		Northeast Afr and Southern Ara Pen	
<i>Commiphora africana</i> (A. Rich.) Engl.	Imp	Ph	In dry season		Dry regions of Afr, from Sen to Eth to S Afr, and mainly in the low and arid areas of Kenya	Sahelo-Saharan to Sahelo-Sudanian savannahs, on light soils (sand) or shallow soils (rocks) and clay soils (rocks), but also on clayey soils
Buxaceae (1)						
<i>Buxus balearica</i> Lam.	Spo	Nph	Sp	SA; SH	Medit Occid; Ana; Ibe-Mau	Matorrals of the low and medium limestone mountains up to 2,200 m

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Cactaceae (2)						
<i>Opuntia dillenii</i> (Ker Gawl.) Haw.	Cul	Nph	Sp; Su		C Ame	
<i>Opuntia ficus-indica</i> L (Mill).	Cul and Subsp	Nph	Sp; Su	A, S.A., S.H.	Widely naturalized in the world	Plains, low and medium mountains
Cannabaceae (1)						
<i>Cannabis sativa</i> L.	Cul and Subsp	Th	Su		C Asia; widely grown elsewhere	
Capparaceae (1)						
<i>Capparis spinosa</i> L.	Spo	Ch	Sp; Su		Southern Eur; Afr Subtem; Western Asia; Aus	Rocks, walls, rocky and clayey slopes, plains and low mountains
Caprifoliaceae (2)						
<i>Lonicera biflora</i> Desf.	Spo	Ph	Sp; Su; Au	A; SA; SH; H	Alg; Ibe Pen	Forests, matorrals, plains and low mountains
<i>Valeriana jatamansi</i> Jones ex Roxb.	Imp	G	Sp; Su		Asia	
Caryophyllaceae (5)						
<i>Corrigiola telephifolia</i> Pourret	Spo	Hem	Sp; Su	SA; SH	Western Medit	Stony and sandy soils of plains and mountains
<i>Herniaria hirsuta</i> L.	Spo	Th	Wi; Sp; Su	SA; SH	Medit	Sandy fields, barren wastelands
<i>Paronychia argentea</i> Lam.	Spo	Hem	Wi; Sp; Su	A; SA; SH; H	Medit; Can Is	Uncultivated places, farms, plains and mountains up to 2,000 m
<i>Silene vulgaris</i> (Moench.) Garck.	Spo	G	Wi; Sp; Su	A; SA; SH; H	Medit; Mac; Eur; Asia; introduced in Ame	Open forests, rocky areas, cultivated and uncultivated fields, plains, low and medium mountains
<i>Spergularia media</i> (L.) C. Presl	Spo	Hem	Sp	S; A; SA; SA; SH	Subcos	Sea sands and salty grounds
Cistaceae (3)						
<i>Cistus ladanifer</i> L.	Spo	Nph	Sp	SH; H	Alg; Ibe Pen; Southern France	Open forests, low mountain scrub
<i>Cistus laurifolius</i> L.	Spo	Ch	Su	SA; H; HM	Medit	
<i>Cistus salvifolius</i> L.	Spo	Ch	Sp	S; SH; H	Medit; W Asia	Forests and matorrals up to 2,100 m; calcifuge

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Biodimatic stage	Chorology	Habitat and ecology
Combrétaceae (2)						
<i>Combretum micranthum</i> G. Don	Imp	Ph	Sp; Su		Sen, Mali; Niger; Burkina Faso; Guinea	
<i>Terminalia chebula</i> Retz.	Imp	Ph	A; Sp		Asia	
Convolvulaceae (1)						
<i>Ipomoea batatas</i> (L.) Lam.	Cul	G	Su		Tro and subtree areas; in Ame; Asia and Afr	Humus-rich soil
Crassulaceae (1)						
<i>Umbilicus horizontalis</i> (Guss.) DC.	Spo	G	Sp; Su	S; A; SA; SH; H	Medit; Mac; Western and Southern Eur; Septen Eur; Septen Afr; Eth; W Asia	Rocks, old walls, slopes, undergrowth, plains, low and medium mountains
Cucurbitaceae (10)						
<i>Bryonia cretica</i> subsp. <i>dioica</i> (Jacq.) Tutin	Spo	G	Sp	A; SA; SH; H	Alg; Tun; Medit; Eur; Western Asia	Forests, scrub, hedges, shady places; plains, low and medium. Mountains, clay and limestone soil
<i>Citrullus colocynthis</i> (L.) Schrad.	Spo	G	Su	S; A; SA	Medit; Mac; Sahara; S Afr; Western Asia	Littoral sands; steppes, arid stony grounds; regs; and silty or sandy wadi beds
<i>Citrullus vulgaris</i> (L.) Schrad.	Cul	G	Sp; Su		Tropical; Medit	Sol très riche en humus et drainé
<i>Cucumis flexuosus</i> L.	Cul	G	Su		Asie	
<i>Cucumis melo</i> L.	Cul	G	Sp; Su		It probably comes from intertropical E Afr where wild varieties still exist.	
<i>Cucumis sativus</i> L.	Cul	G	Su		Native to India; cultivated in Western Asia	Frais, léger, humifère et drainé
<i>Cucurbita maxima</i> Duchesne	Cul	G	Su		Trop regions of S Ame	
<i>Cucurbita pepo</i> L.	Cul	G	Su		Native to Mexico	
<i>Ecballium elaterium</i> (L.) A. Richard.	Spo	G	Sp; Su	SA; SH; H	Medit; Mac	Rubble and wasteland; plains and low mountains
<i>Lagenaria siceraria</i> (Molina) Standl.	Cul	Th	Su		Tropical regions	

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Cynomoriaceae (1)						
<i>Cynomorium coccineum</i> L.	Spo	G	Sp	S; A; SA; SH	Medit; Mac; Eastern Afr. Arabia; Asia	Plains, low and medium mountains
Ericaceae (1)						
<i>Arbutus unedo</i> L.	Spo	Ph	Au; Wi	SA; SH; H	Medit; Mac; Western Asia	Forests and matorrals, generally on silicas, plains, and low and medium mountains
Euphorbiaceae (6)						
<i>Croton tiglium</i> L.	Imp	Ph	Au; Wi		Asia; India	
<i>Euphorbia officinarum</i> L. subsp. <i>echinus</i> (Hook. f. et Cosson) Vindt	Spo	Nph	Su	S; A	Mau	Plains, low and medium mountains
<i>Euphorbia falcata</i> L.	Spo	Th	Sp; Su	A; SA; SH; H	Medit; C and Southern Eur; Western and C Asia	Grasslands, crops, fallow land; plains, low and medium mountains
<i>Euphorbia resinifera</i> Berg.	Spo	Nph	Su	A; SA	Strict endemic of Morocco	Calcareous rocky substrates; low and medium mountains
<i>Mercurialis annua</i> L.	Spo	Th	Au; W; Sp; Su	S; A; SA; SH; H	Western Medit; Italy; Yugoslavia; widely naturalized in temperate regions	Crops, roadsides, rubble, rocks, plains, low and medium mountains
<i>Ricinus communis</i> L.	Spo	Ph	Su; A	A; SA; SH	Afr; Tro; Medit region	Roadsides, hedges, rubble, plains and low mountains
Fabaceae (35)						
<i>Abrus precatorius</i> L.	Imp	Ph	Au; Sp		Afr; Asia; Aus; Trop regions	Liane of forest edges and gallery
<i>Faidherbia albida</i> (Delile) A. Cheval.	Spo	Ph	Wi; Sp	S	Tropical Sahara in India	Ravines and desert depressions
<i>Acacia cyclops</i> A. Cunn. ex G. Don	Cul and Nat	Ph	Wi; Sp	S; A; SA; SH; H	Native to Aus	Plains and low mountains
<i>Arachis hypogaea</i> L.	Cul	Th	Sp; Su		Trop	

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<i>Astragalus gummiifer</i> Labill.	Imp	Th	Sp; Su		S.E. Eur and SW Asia	It is produced mainly in Iran but also in Tur and Syria on a smaller scale.
<i>Chamaecrista absus</i> (L.) H. S. Irwin et Barneby	Imp	Ph	Sp; Su; Au		All Afr except Mor; Alg; Tun; Libya& Egy. Hon; India; Iran; Mex Gulf; Mex NE; Mex NW; Mex SE; Mex SW; Moz; Mya; Nam; Nepal; Neth. Pak; Par; Peru. Bra; Tan; Thai; Togo; Uga; Ven; Viet; W Him; W Aus; Windward Is; Yemen	
<i>Cassia fistula</i> L.	Imp	Ph	Sp		Widely cultivated as an ornamental plant in tropical and subtropical areas.	
<i>Ceratonia siliqua</i> L.	Cul and Subsp	Ph	Au; Wi	SA; SH	Medit	Plains and low mountains
<i>Cicer arietinum</i> L.	Cul and Subsp	Th	Sp		Near East (S.E. Turkey, Armenian lands, Syria)	
<i>Glycine max</i> (L.) Merr.	Imp	Th	Su		Hot regions of South-east Asia	
<i>Glycyrrhiza glabra</i> L.	Imp	Hem	Su		Southern Eur; W Asia; Alg; Eastern Medit	
<i>Lathyrus oleraceus</i> Lam.	Cul and Subsp	Th	Sp		Medit	
<i>Lupinus albus</i> L.	Spo	Th	Sp; Su		E Medit	
<i>Lupinus luteus</i> L.	Spo	Th	Sp	SA; SH	Alg; Tun; Medit Septen; Pal	Sandy soils of plains and low mountains
<i>Lupinus cosentinii</i> Guss.	Spo	Th	Sp	SA; SH	Tun; NW Medit	Sandy and rocky soils of plains and low mountains
<i>Medicago sativa</i> L.	Cul and Subsp	Hem	Sp; Su; Au	SA; SH	Ana; Crimea; introduced everywhere in Medit	

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<i>Medicago orbicularis</i> (L.) Bartal.	Spo	Th	Wi; Sp; Su	A; SA; SH; H	Medit; Can Is; Mad; Western Asia; Aby	Crops, uncultivated fields, grassy hillsides, plains and low mountains
<i>Melilotus indicus</i> (L.) All.	Spo	Th	Wi; Sp; Su	S; A; SA; SH; H	Medit; Mac; Western and C Asia	Fields and pastures, plains and low mountains
<i>Melilotus sulcatus</i> Desf.	Spo	Th	Wi; Sp; Su	S; A; SA; SH; H	Medit; Mac; Western Asia	Crops, uncultivated fields, clay or stony pastures
<i>Ononis natrix</i> L.	Spo	Ch	Sp; Su	S; A; SA; SH	Medit; Can Is; Western Asia	Open forests, ermes matorrals; plains, low and medium mountains
<i>Phaseolus vulgaris</i> L.	Cul	Th	Sp; Su		C and S Ame	
<i>Retama rietam</i> (Forsskal) Webb.	Spo	Nph	Wi; Sp	S	Mor; Alg; Tun	Desert sands
<i>Senna alexandrina</i> Mill.	Imp	Ph	Su		Asia; Africa and Egypt	
<i>Tamarindus indica</i> L.	Imp	Ph	Sp; Su		Native to: Comoros, Madagascar. Southern Hemisphere	
<i>Trifolium alexandrinum</i> L.	Cul	Th	Su; Au		Eastern Medit	
<i>Trifolium pratense</i> L.	Spo	Hem	Sp; Su	SA; SH; H	Medit; Mac; Eur; Siberia; W Asia	Cool forests, wet meadows, plains and mountains
<i>Trigonella foenum-graecum</i> L.	Cul and Subsp	Th	Sp; Su		Western Asia; introduced in Medit	
<i>Vachellia gummifera</i> (Willd.) Kyal. et Boatwr.	Spo	Ph	Sp; Su	S; A; SA	Strict endemic of south-west Morocco	Plains and low mountains
<i>Vachellia nilotica</i> (L.) P. J. H. Hurter et Mabb.	Nat	Ph	Sp; Su		Egy; Maghreb and Sahel; S of Moz and Natal; as well as across the Ara Pen; in Pak; India and Burma	
<i>Vachellia tortilis</i> (Forssk.) Galasso et Bantfi	Spo	Ph	Sp; Su	S; A	Trop Afr and the Ara Pen	
<i>Vicia lens</i> (L.) Coss. et Germ.	Cul and Subspo	Th	Sp		Medit and Eur	

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<i>Vicia ervilia</i> (L.) Willd.	Cul and Subsp	Th	Sp		Medit; C and Southern Eur; Western Asia	Non-forested land
<i>Vicia faba</i> L.	Cul and Subsp	Th	Wi; Sp		Asian and N Afri; Intr in the Medit	
<i>Vigna unguiculata</i> subsp. <i>unguiculata</i> (L.) Walp.	Imp	Th	Sp; Su		Native to almost all of Africa, except North African countries	
<i>Vigna unguiculata</i> (L.) Walp. Fagaceae (5)	Imp	Ph	Sp; Su		Trop regions	
<i>Castanea sativa</i> Mill.	Spo	Ph	Sp; Su	SH	E Medit; Mac; Southern Eur; W Asia	Low siliceous mountains
<i>Quercus coccifera</i> L.	Spo	Ph	Sp	SA; SH; H	Medit Occidental	Plains and low mountains
<i>Quercus faginea</i> Lamk.	Spo	Ph	Sp; Su	SH; H	Ibe Pen; Alg; Tun	Plains, low and medium mountains
<i>Quercus ilex</i> L.	Spo	Ph	Sp; Su	SA; SH; H	Alg; Tun, Cyr; Southern Eur; Asia Minor; Syria	Low, medium and high mountains up to 2,900 m
<i>Quercus suber</i> L.	Spo	Ph	Wi; Sp; Su	SA; SH; H	Medit occidental	Plains, low and medium mountains, on siliceous soils
Gentianaceae (1)						
<i>Centaureum erythraea</i> Rafn.	Spo	Th	Sp; Su	SA; SH; H	Medit; Eur; Western Asia	Open forests, matorrals, fields, plains, low and medium mountains
Geraniaceae (1)						
<i>Pelargonium graveolens</i> L'Hér.	Cul	G	Sp; Su		Mad; Can; Mar	
Juglandaceae (1)						
<i>Juglans regia</i> L.	Cul and Subsp	Ph	Sp		Central Asia	They are cultivated on the banks of streams and seguias in the mountains
Lamiaceae (42)						
<i>Ajuga reptans</i> (L.) Schreb.	Spo	Hém	Sp; Su	A; SA; SH; H	Afr; Mac; Atlantic and S Eur; Medit	Degraded forests, matorrals, farms, uncultivated fields, rocky areas, plains, and mountains up to 2,700 m

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<i>Balota hirsuta</i> (Willd.) Benth.	Spo	Ch	Sp; Su	A; SA; SH; H	Medit Occid; Libya; C Sahara	Matorrals, rocks; plains and low mountains
<i>Clinopodium atlanticum</i> (Baill.) N. Galland	Spo	Ch	Sp; Su	SA; SH; HM	Strict endemic of Morocco	
<i>Clinopodium nepeta</i> (L.) Kuntze	Spo	Ch	Wi; Sp; Su	SA; SH; H	Alg; Tun; Mac; Eur; Western Asia	Forests and matorrals, stony farms, rocks, plains and low mountains
<i>Lavandula × heterophylla</i> Viv.	Cul	Ch	Sp; Su			
<i>Lavandula dentata</i> L.	Spo	Ch	Sp; Au	SA; SH	Sp; Bal Is; Sicily; Malta; Alg; Mac; Eth; Arabia	Plains and low mountains
<i>Lavandula multifida</i> L.	Spo	Ch	Sp; Au	A; SA; SH	North Afr; North -Western Medit	Plains and low mountains
<i>Lavandula angustifolia</i> Mill.	Imp and Cul	Ph	Su		Native to the mountainous and sunny areas of the Medit and Nat in Eur; Aus and the U.S.	
<i>Lavandula pedunculata</i> (Mill.) Cav. subsp. <i>atlantica</i> (Br. Bl.) Romo	Spo	Ch	Sp	SA; SH; H	Strict endemic of Morocco	Medium mountains
<i>Lavandula stoechas</i> L.	Spo	Ch	Sp	SA; SH	Alg; Tun; Can Is; Southern Eur; Western Asia	Plains and low mountains
<i>Marrubium vulgare</i> L.	Spo	Ch	Sp; Su	A; SA; SA; SH; H	Medit; Mac; Eur; W and C Asia. Naturalized in Ame; Cosm	Mostly ruderal; plains, low and medium mountains
<i>Melissa officinalis</i> L.	Cul	Ch	Sp; Su	SH; H	Medit; Can Is; Mad; W Asia.	Matorrals and cool forests; low mountains
<i>Mentha aquatica</i> L.	Spo	Hem	Sp; Su	SA; SH	Medit; Mad; Azores; Eur; W Asia; Afr; Mad; Alg; Tun; Lib	Plains Marshes
<i>Mentha gattefossesi</i> Maire	Spo	Hem	Sp; Su	SH; H	Strict endemic of Morocco	Slightly humid pastures, water edges, and low and medium mountains
<i>Mentha longifolia</i> (L.) Huds.	Spo	Hem	Sp; Su	SH; H	Medit; Can Is; Eur; Asia; Southern Afr; Mad; Can; Mar; Alg; Tun; Lib	Edges of streams and Davas, humid places; low and medium limestone mountains

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<i>Mentha</i> × <i>piperita</i> L.	Cul	Hem	Su		Mad; Alg; Tun; Lib	
<i>Mentha pulegium</i> L.	Spo	Hem	Sp; Su	SA; SH; H	Medit; Mac; C and S Eur; W Asia; Aby; Mad; Can; Alg; Tun; Lib; Egy	Wet places of plains, low and medium mountains
<i>Mentha spicata</i> L.	Cul and Subsp	Hem	Su; Au	Non incluse dans la clé	Eur; Alg; N Afr; Cul in Mad; Can; Mau; Alg; Tun; Lib	
<i>Mentha suaveolens</i> Ehrh.	Spo	Hem	Sp; Su	S; A; SA; SH; H	Alg; Tun; Mac; C and Southern Eur	Waterfronts; plains, low and medium mountains
<i>Mentha</i> sp.	Cul	Hem	Sp; Su	SA; SH		
<i>Nepeta apuleji</i> Ucria	Spo	Hem	Sp; Su	SA; SH; H	Alg; Tun; Spa; Scile	Open forests, clearings, rocky outcrops, plains and low mountains
<i>Ocimum basilicum</i> L.	Cul	Th	Sp; Su		Alg; Tun; Lib	
<i>Origanum compactum</i> Bentham	Spo	Ch	Su	A; SA; SH	S Spa; N Afr	Forests, matorrals, rocky fields, rocks, plains and low mountains
<i>Origanum majorana</i> L.	Cul	Ch	Su		E Medit; W Asia. Cul in Mad; Alg; Tun; Lib	
<i>Origanum</i> sp.	Cul	Ch	Sp			
<i>Origanum vulgare</i> L. subsp. <i>virans</i> (Hoffm. et Link) Bonnier et Layens	Cul and Spo	Ch	Su	SH; H	Mac; Ibe Pen; Mad; Can	Open forests and matorrals of low (and medium) mountains
<i>Salvia rosmarinus</i> Spenn.	Spo and Cul	Nph	Sp; Su	A; SA; SH	Medit; Mac; Southern Eur; Asia Minor	Open forests and matorrals of low and medium mountains
<i>Salvia aegyptiaca</i> L.	Spo	Ch	Wi; Sp; Su	S; A; SA	Afr; Can Is; Cape Verde Islands; Nubia; W Asia	Rocky pastures; plains, low and medium mountains
<i>Salvia officinalis</i> L.	Cul	Ch	Sp; Su		Medit; Eur	Arid places
<i>Salvia tingitana</i> Ettlinger	Cul	Hem	Sp; Su		Spa	
<i>Salvia verbenaca</i> (L.) Briq.	Spo	Hem	Wi; Sp; Su	A; SA; SH; H	Septen Afr; Hoggar; Mac; C and S Eur; W Asia	Forest clearings, matorrals, farms, steppes, plains, low and medium mountains

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Satureja calamintha</i> subsp. <i>nepeta</i> (L.) Briq.	Spo	Ch	Wi; Sp; Su	SA; SH; H	Alg; Tun; Mac; Eur; Western Asia	Forests and matorrals, stony farms, rocks, plains and low mountains
<i>Satureja montana</i> L.	Spo	Ch	Su; Au	A; SA	Native to: Alb, Austria, Fra, Greece, Italy, Leb-Syr, Spa, Tur, Yug, Int into: Azores, Por, Texas	Rocks and matorrals of the sublittoral
<i>Micromeria fontanestii</i> K. Koch	Spo	Ch	Sp; Su	A; SA; SH	Alg	Limestone rocks; low mountains
<i>Teucrium polium</i> L.	Spo	Ch	Sp; Su	SA; SH; H	Medit occidental	Forest clearings, matorrals, pastures, rocky areas, steppes, sea cliffs, plains and mountains
<i>Thymus broussonetii</i> Boiss.	Spo	Ch	Sp	A; SA	Strict endemic of Morocco	Open forests and matorrals; plains and low mountains
<i>Thymus × citriodorus</i> (Pers.) Schreb.	Cul	Ch			Western Medit	
<i>Thymus maroccanus</i> Ball.	Spo	Ch	Sp	A; SA; SH	Strict endemic of Morocco	Open forests, matorrals and rocky slopes of low mountains
<i>Thymus saturejoides</i> Cosson	Spo	Ch	Sp	A; SA; SH	Alg	Forest clearings, matorrals, meadows, low and medium mountains
<i>Thymus vulgaris</i> L.	Cul	Ch	Sp; Su		Spa; Bal Is; France; Italy; Mad; Can; Alg; Tun	Dry and arid places of the Mediterranean
<i>Thymus zygis</i> L.	Spo	Ch	Sp; Su	SA; SH; H	Ibe Pen	Forest clearings, stony pastures of low and medium mountains
<i>Vitex agnus-castus</i> L.	Spo	Nph	Su	S; A; SA; SH; H	Medit; Southern Eur; Western Asia	Wadi banks, plains and low mountains
Lauraceae (5)						
<i>Cinnamomum camphora</i> (L.) J. Presl	Imp	Ph	Su		Asia (China, Taiwan and Japan)	
<i>Cinnamomum aromaticum</i> Nees	Imp	Ph	Sp		Asia	
<i>Cinnamomum verum</i> J. Presl	Imp	Ph	Sp; Su		Asia	
<i>Laurus nobilis</i> L.	Spo	Ph	Wi; Sp	SH; H	Medit; Azores	Ravines and rocks of forests and matorrals; plains and mountains up to 1,800 m
<i>Persea americana</i> Mill.	Cul	Ph	Su		Afr; Asia; Mac; Ame	Humus-rich, neutral and well-drained soil

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Linaceae (1)						
<i>Linum usitatissimum</i> L.	Cul and Subsp	Th	Sp; Su	A; SA; SH; H	Asia Minor and Transcaucasia; Subsp in large part of the Globe	
Lythraceae (2)						
<i>Latsonia inermis</i> L.	Cul	Nph	Sp; Su		Egy; Arabia; Iran; India	
<i>Punica granatum</i> L.	Cul and Subsp	Ph	Sp; Su		Iranian-Turanian; Medit	
Malvaceae (4)						
<i>Abelmoschus esculentus</i> (L.) Moench	Cul	Th	Su		Native to tropical Africa	
<i>Hibiscus sabdariffa</i> L.	Imp	Ph	Su; Au		Guinea; W and C Afr; Egy; and Mexico; SE Asia	Humus soil, fresh and drained
<i>Malva parviflora</i> L.	Spo	Hem	Wi; Sp	S; A; SA; SH	Medit; Asia; Mac	Paths, rubble, uncultivated fields, plains and low mountains. Nitrophilous
<i>Malva sylvestris</i> L.	Spo	Hem	Wi; Sp; Su	All the bioclimates	Medit region; Mad; SW Asia	Fields and wastelands, rubble; plains and mountains, up to 3,000 m
Moraceae (2)						
<i>Ficus carica</i> L.	Cul and Subsp	Ph	Sp; Su	A; SA; SH; H	Medit; Mesop; Iran; Baluchistan; N India	Plains, low and medium mountains
<i>Morus alba</i> L.	Cul	Ph	Sp		Asia. Cultivated in all the Medit Basin	
Myristicaceae (1)						
<i>Myristica fragrans</i> Houtt.	Imp	Ph	Au; W; Sp; Su		Trop regions; Asia	
Myrtaceae (4)						
<i>Eucalyptus globulus</i> Labill.	Cul	Ph	Sp; Su		Aus	
<i>Myrtus communis</i> L.	Spo	Nph	Sp	SA; SH	Medit; Mad; Azores; Western and C Asia	Forests and scrub, plains and low siliceous mountains

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<i>Pimenta dioica</i> (L.) Merr.	Imp	Ph	Su; Au	Trop region; C Ame Asia	Poor and stony soil	
<i>Syzygium aromaticum</i> (L.) Merr. et Perry.	Imp	Ph	Su			
Nitriariaceae (1)						
<i>Peganus harmala</i> L.	Spo	Ch	Sp; Su	S, A, SA	Medit; Mac; N Africa; W and C Asia	Steppes, wastelands, rubble, plains and low mountains
Oleaceae (3)						
<i>Fraxinus angustifolia</i> Vahl.	Spo	Ph	Wi; Sp	SA; SH; H	Alge; Tun; Southern Eur; Western Asia	Ripisylves; low and medium mountains
<i>Olea europaea</i> L.	Cul	Ph			Medit	
<i>Olea europaea</i> var. <i>sylvestris</i> (Mill.) Lehr.	Spo	Ph	Sp	A; SA; SH; H	Medit	Plains and low mountains
Paeoniaceae (1)						
<i>Paeonia coriacea</i> Boiss.	Spo	G	Sp	SH; H	Medit; S Eur; Caucasus; Asia Minor; Iraq; Iran	Medium mountain forests
Papaveraceae (4)						
<i>Fumaria parviflora</i> Lam.	Spo	Th	Wi; Sp; Su	S; A; SA; SH	Medit; widely naturalized elsewhere	Fields, uncultivated places, beach
<i>Glaucium corniculatum</i> (L.) Curtis	Spo	Th	Wi; Sp; Su	A; SA; SH	Medit; Mac; C and Southern Eur; Western Asia	Uncultivated fields, stony pastures of plains and low mountains; more frequent in dry areas
<i>Papaver rhoas</i> L.	Spo	Th	Sp; Su	A; SA; SH; H	Medit; Mac; C and S Europe; Asia; Aby	Fields, harvests, uncultivated places, plains, low and medium mountains
<i>Papaver somniferum</i> L.	Cul and Subsp	Th	Sp; Su		Medit; Mac; Asia	It appears to be related to silts more than to sands or clays
Pedaliaceae (1)						
<i>Sesamum indicum</i> L.	Cul	Th	Sp; Su		Introduced in Medit	
Phyllanthaceae (1)						
<i>Phyllanthus emblica</i> L.	Imp	Ph	Sp; Su		Nepal; India; Sri Lank	

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Piperaceae (3)						
<i>Piper cubeba</i> L. f.	Imp	Ph	Su		Southeast Asia	
<i>Piper longum</i> L.	Imp	Ph	Su		Eur	
<i>Piper nigrum</i> L.	Imp	Ph	Su		Asia; Trop zone	
Plantaginaceae (4)						
<i>Globularia alypum</i> L.	Spo	Ch	Sp	A; SA; SH; H	Medit	Forests and matorrals; plains and low mountains
<i>Plantago offra</i> L.	Spo	Th	Sp	S; A; SA; SH; H	Medit; Mac; Western Asia	Degraded environments, wastelands, fields, plains and low mountains
<i>Plantago lanceolata</i> L.	Spo	Hem	Sp; Su	A; SA	Medit; Eur; Siberia; W Asia; Azores	Wet places; plains and mountains
<i>Plantago major</i> L.	Spo	Th	Sp; Su; Au	S; A; SA; SH; H	Medit; Mac; Eur; Siberia; W and C Asia	Wet places of the plains, low and medium mountains
Plumbaginaceae (3)						
<i>Armeria simplex</i> Pomel.	Spo	Hem	Wi; Sp	SA; SH	Alg	Sandy plains and primarily coastal
<i>Limonium sinuatum</i> (L.) Mill.	Spo	Hem	Wi; Sp	S; A; SA; SH	Medit; Sahara; Southern Eur; Western Asia	Plains and low mountains
<i>Plumbago europaea</i> L.	Spo	Ch	Su; Au	A; SA; SH; H	Medit	Nitrophilous; plains, low and middle mountains
Polygonaceae (3)						
<i>Polygonum aviculare</i> L.	Spo	Th	Sp; Su	SA; SH; H	Cosm	Fields, wastelands, rubble, roadsides, plains and mountains up to 2,100 m
<i>Rumex spinosus</i> L.	Spo	Th	Wi; Sp	S; A; SA; SH; H	Medit; Mac	Sandy soils, roadsides; nitrophilous
<i>Rumex crispus</i> L.	Spo	Hem	Sp; Su	A; SA; SH; H	Subcos	Wetlands, stream banks, irrigated meadows, and mountains up to about 2,300 m
Portulacaceae (1)						
<i>Portulaca oleracea</i> L.	Spo	Th	Sp; Su	A; SA; SH	Subcos	Fields, crops, rubble, plains, low and middle mountains. Anthrophochore, nitrophilous

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
Ranunculaceae (4)						
<i>Clematis flammula</i> L.	Spo	Ph	Sp; Su	SA; SH; H; HM	Medit; Mac; Caucasus; Iran	Forests, matorrals, maritime dunes
<i>Staphisagria macrosperma</i> Spach.	Spo	Hem	Sp	SH; H	Medit; Mac	Forests and fresh matorrals; plains and low mountains
<i>Nigella sativa</i> L.	Cul and Subsp	Th	Sp		Native to W Asia; widely Cul in the Medit	Fields and gardens
<i>Ranunculus muricatus</i> L.	Spo	Th	Sp	A; SA; SH; H	Medit; Mac; Southern Eur; W Asia. Nat elsewhere	Wet places, edges of seguias and streams, plains and low mountains
Rhamnaceae (3)						
<i>Rhamnus alaternus</i> L.	Spo	Nph	Wi; Sp	SA; SH; H	Medit	Plains and mountains
<i>Ziziphus lotus</i> (L.) Lam.	Spo	Nph	Sp; Su	S; A; SA; SH	Medit; Saharo-Arabic	Non-forested areas; plains, low (and medium) mountains
<i>Ziziphus jujuba</i> (L.) Mill.	Cul and Subsp	Ph			Native to N China; subsp in the Medit region	
Rosaceae (14)						
<i>Crataegus monogyna</i> Jacq.	Spo	Nph	Wi; Sp	SA; SH; H	W Medit; Eur; W and C Asia. Intro in Ame	Low and medium mountains
<i>Cydonia oblonga</i> Mill.	Cul and Subsp	Ph	Sp		Western and C Asia; cultivated in Medit	
<i>Rhaphiolepis bibas</i> (Lour.) Galasso et Banfi	Cul	Ph	Au; Wi		Temperate regions	
<i>Fragaria × vesca</i> L.	Cul	G	Sp; Su		Eur; Asia; North and South Ame	Woods, hedges, bushes
<i>Malus communis</i> Desf.	Cul	Ph	Sp		Eur	Fertile, drained and neutral soil
<i>Prunus cerasus</i> L.	Cul	Ph	Sp; Su		Alg; Tun; NW Eur, Caucasus; Western Asia	Ordinary non-clay and neutral soil

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Prunus amygdalus</i> Stokes var. <i>amara</i> DC.	Cul or Spo	Ph	Sp; Su		Medit; W Asia. Cul in subtro and temperate regions of the world	Forests and rocks of the limestone mountains
<i>Prunus amygdalus</i> Batsch	Cul or Spo	Ph	Wi; Sp	SA; SH; H	Native to W Asia; Cul in subtro and temperate regions	Forests and rocks of the limestone mountains
<i>Prunus armeniaca</i> L.	Cul	Ph	Wi; Sp		Asia; Iran; Turkestan	
<i>Prunus domestica</i> L.	Cul	Ph	Wi; Sp		Southern and C Eur; Western Asia to Iran	
<i>Prunus persica</i> (L.) Batsch	Cul	Ph	Wi; Sp		Asia; China	Low and medium mountains
<i>Rosa canina</i> L.	Spo	Nph	Sp; Su	SA; SH; H	Eurasia; Mac	
<i>Rosa × centifolia</i> Mill.	Cul	Ph	Sp; Su			
<i>Rubus ulmifolius</i> Schott	Spo	Nph	Sp; Su	A; SA; SH; H	Medit; Mac; Eur; naturalized elsewhere	Hedges, scrub and wet ravines; plains, low and medium mountains
Rubiaceae (2)						
<i>Coffea arabica</i> L.	Imp	Ph	Su		Afr	Soil: drained, acid, fertile
<i>Rubia peregriana</i> L.	Spo	Ch	Sp; Su	A; SA; SH; H	Medit; Mac; Western Eur	Forests and matorrals; plains, low and medium mountains
Rutaceae (8)						
<i>Citrus × aurantium</i> L.	Cul	Ph	Sp		Asia; Medit	
<i>Citrus aurantium</i> L. var. <i>limetta</i> Guillaumin	Cul	Ph	Sp			
<i>Citrus aurantium</i> L. var. <i>sinensis</i> L.	Cul	Ph	Sp			
<i>Citrus medica</i> L.	Cul	Ph	Sp			
<i>Citrus × aurantium</i> f. <i>deliciosa</i> (Ten.) M. Hiroe	Cul	Ph	Sp		S Asia. Cul in Sp; Alg; Tun and the U.S.	
<i>Citrus × limon</i> (L.) Osbeck	Cul	Ph	Sp		Subtropical biome	
<i>Ruta graveolens</i> L.	Cul	Ph	Sp; Su		Southern Eur	Arid hillsides, and old walls, often escaped from ancient cultures

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Ruta montana</i> (L.) L.	Spo	Ch	Sp; Su	A; SA; SH	Medit; Asia Minor; Caucasus	Open forests, rocky matorrals, low and medium mountains
Salicaceae (1)						
<i>Populus alba</i> L.	Spo	Ph	Wi; Sp	A; SA; SH; H	Medit; Mac; C and Southern Eur; W Asia; introduced elsewhere	Banks of the rivers, wet places of the plain and the low mountains until 2,000 m
Salvadoraceae (1)						
<i>Salvadora persica</i> L.	Spo	Ph	Wi; Sp	S	Trop regions from Sen to India; Sahara; Asia; Arabia	Rockeries, desert spreads, ravine banks
Sapotaceae (1)						
<i>Sideroxylon spinosum</i> L.	Spo or Cul	Ph	Sp	S; A; SA	Alg; and W Mor	Plains and low mountains
Schisandraceae (1)						
<i>Illicium verum</i> Hook. f.	Imp	Ph	Sp; Su		Asia (native to China Southeast, Vietnam. Int: Cambodia; China South-Central)	
Scrophulariaceae (1)						
<i>Verbascum sinuatum</i> L.	Spo	Th	Sp; Su	A; SA; SH; H	Medit region; Ira-Tur and Mac	Matorrals, ermes, steppes, plains, low (and medium) mountains
Solanaceae (18)						
<i>Atropa bella-donna</i> L.	Spo	Hem	Sp; Su	SH; H	Alg; Eur (except extreme N); W and C Asia	Cool forests of the medium mountains
<i>Capsicum annuum</i> L.	Cul	Th	Au; W; Sp; Su		Ame	
<i>Capsicum frutescens</i> L.	Cul	Th	Au; W; Sp; Su		Ame	

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Biodimatic stage	Chorology	Habitat and ecology
<i>Datura stramonium</i> L.	Spo or Nat	Th	Sp; Su; Au	S; A; SA; SH	Cosm; Native to Ame. Nat in temperate and warm regions of the world	Crops, rubble and open areas; nitrophilous
<i>Hyoscyamus albus</i> L.	Spo	Th	Sp; Su	A; SA; SH; H	Medit; Mac; SW Asia	Rubble, crops, old walls; nitrophilous
<i>Lycium europaeum</i> L.	Spo or Nat	Nph	Sp; Su	A; SA; SH	Medit; Mad; Can Is; S Eur; SW Asia	Neighborhoods of homes
<i>Mandragora autumnalis</i> Bertol.	Spo	G	Sp; Su	SA; SH	Medit	Matorrals, farms, wastelands, fields, especially on clay soils
<i>Nicotiana glauca</i> Graham	Spo or Nat	Nph	Sp; Su; Au	A; SA; SH	Native to Ame. Southern Eur and N Afr	Ruderal nitrophilous, Rocks, old walls, rubble
<i>Nicotiana tabacum</i> L.	Cul	Th			Eur; Ame	
<i>Alkekengi officinarum</i> Moench	Imp	Ch	Sp; Su; Au		Eur	
<i>Solanum elaeagnifolium</i> Cav.	Nat	G	Sp	A; SA	Adventitious or naturalized in several regions of the Globe.	Weed of the cultures, plains and low mountains, invasive in the perimeters of Tadla and Haouz, adapting itself to all the environments and all the types of ground
<i>Solanum lycopersicum</i> L.	Cul	Th	Au; W; Sp; Su		Northwestern South Ame	
<i>Solanum melongena</i> L.	Cul	Nph	Au; W; Sp; Su		Eur; Asia; N Afr	
<i>Solanum nigrum</i> L.	Spo	Th	Sp; Su	S; A; SA; SH; H	Cosm	Rubble, rocks, crops; nitrophilous; plains, low and middle mountains
<i>Solanum anguivi</i> Lam.	Spo or Nat	Nph	Sp; Su	A; SA; SH	Naturalized on the littoral of the Medit; native of the S of Afr	Forest clearings, sandy fields, rubble, plains and low mountains
<i>Solanum tuberosum</i> L.	Cul	G	A; W; Sp; Su		Southwestern S Ame	
<i>Withania frutescens</i> (L.) Pauquy	Spo	Nph	Sp; Su; Au	A; SA; SH; HM	Alg; Can Is; Spa; Bal Is	Open forests, matorrals, plains and low mountains
<i>Withania somnifera</i> (L.) Dunal	Spo	Ch	Sp; Su	S; A; SA; SH	Medit; Sahara; Can Is; Cape Verde; S Eur; SW Asia; Afr; Trop	Rubble, hedgerows, crops; nitrophilous; plains and low mountains

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Styracaceae</i> (1)						
<i>Styrax benzoin</i> Dryand	Imp	Ph	Sp; Su		Sumatra and Indonesia, tropical regions	
<i>Tamaricaceae</i> (1)						
<i>Tamarix aphylla</i> (L.) H. Karst.	Spo	Ph	Su	S; A	Sahara-Sindian	Oued beds, desert ravines
<i>Taxaceae</i> (1)						
<i>Taxus baccata</i> L.	Spo	Ph	Sp	H	Alg; Eur; W Asia, Palearctic temperate	Shaded ravines and forests of the medium mountains
<i>Theaceae</i> (1)						
<i>Camellia sinensis</i> (L.) Kuntze	Imp	Ph	Au		Asia	
<i>Thymelaeaceae</i> (5)						
<i>Daphne gnidium</i> L. subsp. <i>mauritania</i> (Nieto Feliner) J. J. Halda	Spo	Ch	Sp	SA; SH	Alg; Tun	Forests, matorrals, farms, fields; low plains and medium mountains
<i>Daphne laureola</i> L.	Spo	Nph	Sp; Su	H	Alg; Azores; Eur	Forests, wet mountain rocks, 8,00–3,000 m
<i>Thymelaea hirsuta</i> (L.) Endl.	Spo	Nph	Wi; Sp	A; SA; SH	Medit; Eur; S and Southwest Asia	Steppes, forest clearings, rock gardens
<i>Thymelaea lythroides</i> Barr et Murb.	Spo	Nph	Wi; Sp	SA; SH	Southern Spa	Matorrals and glades of subraies in general on sandy soils
<i>Thymelaea virgata</i> (Desf.) Endl.	Spo	Nph	Sp; Su	SA; SH; H	Alg; Iberian-Mexican	Open forests, matorrals, earthy and rocky soils; plains, low and medium mountains
<i>Tiliaceae</i> (1)						
<i>Tilia cordata</i> Mill.	Imp	Ph	Su		All Eur; except the extreme N; Siberia	
<i>Urticaceae</i> (3)						
<i>Urtica dioica</i> L.	Spo	G	Su; Au		Subcos	Moist cultivated places, edges of seguias, fresh ravines; nitrophilous
<i>Urtica pilulifera</i> L.	Spo	Th	Sp	A; SA; SH; H; HM	Medit; non-Arctic Eur; Western Asia	Roadsides, hedges, rubble; nitrophilous; plains and low mountains

PHYLUM (no. of family), families (no. of species) and species	Plant type	Life form	Flowering period	Bioclimatic stage	Chorology	Habitat and ecology
<i>Urtica urens</i> L.	Spo	Th	Sp	A; SA; SH; H; HM	Medit; Maca; Afr; Eur; W Asia; introduced in Ame and Aus	Fields; uncultivated places; nitrophilous, plains, low and medium mountains
Verbenaceae (2)						
<i>Aloysia citrodora</i> Palau	Cul	Ch	Sp; Su		S Ame	
<i>Verbena officinalis</i> L.	Spo	Ch	Sp; Su	S; A; SA; SH; H	Subcos	Wet places; plains, low and medium mountains
Vitaceae (1)						
<i>Vitis vinifera</i> L.	Cul and Subsp	Ph	Sp	SA; SH; H	Medit; Mac; Eur; W Asia	Wet ravines and watersides; plains, low and medium mountains
Zygophyllaceae (2)						
<i>Tribulus terrestris</i> L.	Spo	Th	Sp; Su	S; A; SA; SH	Medit; Mac; Southern Eur; Western and C Asia	Dry fields, roadsides, sandy, grassy places, plains and low mountains
<i>Zygophyllum gaetulum</i> Emb. et Maire	Spo	Ch	Sp	S	Alg; Can Is	Desert steppes

Abbreviations

Biological type: Ph = Phanerophyte, Ch = Chamephyte, Hem = Hemicryptophyte, G = Geophyte, Th = Therophyte.
Bioclimatic stage: S = High Mountains.
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 plateaus; Om = Mountains of eastern Morocco; LM = Mediterranean coastline; R = Rif.
Chorology: Aby = Abyssinia; Afr = Africa; Alb = Albania; Alg = Algeria; Ame = America; Ana = Anatolia; Arm = Armenia; Ara Pen = Arabian Peninsula; Atl = Atlantic; Aus = Australia; Azer = Azerbaijan; Bal Is = Balearic Islands; Bor = Boreal; Bra = Brazil; Can = Canarian; Can Is = Canary Islands; C = Central; Cosmop = Cosmopolitan; Circummed = Circummediterranean; Cyp = Cyprus; Cyr = Cyrenaica; Eastern Medit = Eastern Mediterranean; Egy = Egypt; Eth = Ethiopia; Eur = European; Euras = Eurasian; Fra = France; Ibero-Maur = Ibero-Mauritanian; Ibe = Iberian-Mauritanian; Jor = Jordan; Irano-Tour = Irano-Touranian; Ital = Italian; Him = Himalaya; Hon = Honduras; Lib = Libya; Mac = Macaronesian; Mad = Madeira; Mal = Malta; Mau = Mauritania; Medit = Mediterranean; Mesop = Mesopotamia; Mex = Mexico; Midd E = Middle East; Moz = Mozambique; Mya = Myanmar; Nam = Namibia; Neth = Netherlands; Occid = occidental; Leb = Lebanon; Paleo-trop = Paleo-tropical; Paleo-temp = Paleo-temperate; Pal = Palestine; Pak = Pakistan; Par = Paraguay Por = Portugal; Spa = Spain; Subtro = subtropical; Sen = Senegal; Sic = Sicily; Subcos = Subcosmopolite; Septen = septentrional; Syr = Syria; Tan = Tanzania; Thai = Thailand; Trop = Tropical; Tun = Tunisia; Tur = Turkey; Uga = Uganda; U.S. = United States; Ven = Venezuela; Viet = Vietnam; Yug = Yugoslavia; Yug = Yugoslavia.
Flowering period: Su = Summer; Au = Autumn; Wi = Winter; Sp = Spring.
Orientation: N = North; S = South; E = East; W = West.
Plant type: Adv = Adventitious; Cul = Cultivated; Imp = Imported; Int = Introduced; Nat = Naturalized; Spo = Spontaneous; Subsp = Subspontaneous.