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Floristic Analysis and Species Diversity of the Family Fabaceae represented by voucher specimens Depending on the Flora of Libya

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ABSTRACT

The aim of this present research was to explore the floristic analysis and species diversity of the Family Fabaceae depending on species which are represented by voucher specimens and deposited at the National herbarium depending on the data provided from the Flora of Libya series. 7 species *Pisum syriacum*, *Coronilla emerus*, *Astragalus massiliensis*, *Vicia sericocarpa*, *Vicia hirsuta*, *Retama monosperma*, and *Sesbania sesban* were added as a new record to the family Fabaceae in Libya. Results disclosed that the family Fabaceae in Libya is composed of 198 species belonging to 42 genera. The largest genera in the family Fabaceae in the flora of Libya are *Astragalus* which includes 26 species, followed by *Trifolium* with 21 species. Simpson's Diversity index indicated that the Family Fabaceae has high diversity. The life forms and chorological spectra of plant species were analyzed. There are few trees and

shrubs species in our data; this can be referred to as the difficulties for most species to grow in a dry habitat. It appears that annual and perennial life forms are the preferable strategy in the temperate deserts of Libya. Therophytes displayed the greatest number of species (69.19%), followed by Hemicryptophytes (14.65%), Nanophanerophytes (7.57%), Therophytes / Hemicryptophytes (5.55%), Chaemephytes (2.02%) and Phanerophytes (1.01%). Based on the results obtained from the geographical distribution of the species showed that the highest percentage is (58.1%) for the Mediterranean region, followed by (8.6 %) Mediterranean / Irano-Turanian regions. The results obviously showed that the majority of species distribution of the family Fabaceae is located within the Mediterranean region**.**

Keywords: Flora of Libya, Fabaceae, Species Diversity, Floristic Analysis, Life Forms, Chorotype.

1. INTRODUCTION

The legume family (Fabaceae) is the most diverse plant family in the world (Beech *et al.,* 2017). It is a family with about 770 genera and 19,500 species; it is widely distributed and is the third-largest land plant family of angiosperms in species numbers after Asteraceae and Orchidaceae in the global context (LPWG, 2017). The family has economic importance in supplying food crops that provide highly nutritious sources of protein and micronutrients for man and his animals (Graham, 2003; Yahara et al., 2013; Okeke et al., 2019). Some plants in this family are important agricultural and food plants, including *Pisum sativum* (pea), *Phaseolus* (beans), *Medicago sativa* (alfalfa), *Cicer arietinum* (chickpeas), *Arachis hypogaea* (peanut) and *Glycyrrhiza glabra* (liquorice) (Rahman, & Parvin, 2014). A number of these plants have great importance in medicinal purposes and also used to produce a large range of natural products including flavors, dyes, poison (Patel & Shah, 2014; Ahmad et al., 2016). Ciotir *et al*., 2019 said that in the family Fabaceae many species were identified as toxic, include15 species with known human toxicity, 118 species with animal toxicity, 26 species with animal toxicity in laboratory studies, and 80 species with predicted toxicity based on reported information from the Perennial Agriculture Project Global Inventory (PAPGI). Ali et al., (2019) said that the family Fabaceae in Libya has many traditional uses, including 37 species used in medicinal, and 33 species have harmful effects and considered poisonous plants, and ornamental represented by 9 species. Fabaceae plant habits are trees, shrubs, and herbaceous plant perennials or annuals (Rahman, & Parvin, 2014, Heuzé *et al*., 2018). The widespread and largest genus in this family is *Astragalus* that over 2,400 species, followed by *Crotalaria* and *Indigofera* about 700 species of each, which contain about 9.4% of all flowering plant species (Magalion & Sanderson, 2001, Rahman & Parvin, 2014).

Figure 1. Map of Libya. (Via https://www.google.co.uk/map of Libya)

Libya is a country in the region of North African. It lies along the southern coast of the Mediterranean between latitude 32º 56' 08" North and longitude 25º 08' 51" East (Figure 1) and has an area of about 1, 759, 540 square kilometers (El-Mokasabi, 2017), except the coastal belt, Jabal Nafousa, and Al Jabal El-Akhdar regions more than 90% of the Libya area is desert ([El-Darier & El-Mogaspi, 2009). Boulos (1972) said that the coastal strip is about 5.2% of the whole country which extends from the Egyptian to the

Tunisian borders. This area receives an adequate amount of rainfall in winter and quite fertile, specifically in the east and west; therefore a great part of this belt shows the typical flora. Four Biogeographical regions are recognized in Libya, which are the Mediterranean region, Mauritanian steppe of Irano-Turanian region, the Saharo- Arabian region and the Sudanian region (Qaiser & El-Gadi, 1984). The climate characterized by the cool, rainy winter season and hot dry summer, it's typical of the Mediterranean climate. The climate is moderated along the coastal littoral by the Mediterranean Sea, but it is over most of the country is that of the hot, arid Sahara (Sharashy, 2016). This study is based on the analysis of the Family Fabaceae depending on legume species which are represented by voucher specimens and deposited at the National herbarium by (Jafri, 1980) in Flora of Libya series.

2. FLORISTIC

This paper represents an overview of the Family Fabaceae depending on the analysis legume species which are represented by voucher specimens, and deposited at the National herbarium, Faculty of Science, University of Tripoli [ULT], with life form patterns, distribution of species and chorotype. Taxa, which are not represented by voucher specimens excluded from this study. According to Jafri, & Ali, (1976), Klopper *et al*., (2007) and Mahklouf, & Etayeb (2019) there are 2088 species belonging to 844 genera and 145 families in the flora of Libya as angiosperms. The third dominant family in the flora of Libya is Fabaceae (EI-Mokasabi, 2017) with 200 species of 42 genera (Jafri, 1980). When excluded the species without voucher specimens at the National herbarium the present study includes 42 genera and 191 species with 7 new records (Table 1). The Family Fabaceae in Libya became 198 species belonging to 42 genera (Appendix). The largest genera in the Family Fabaceae in the flora of Libya are *Astragalus* which includes 26 species, followed by *Trifolium* with 21 species, *Medicago* (19 species), *Vicia* (15 species), Lotus (14 species), Lathyrus and Ononis (12 species each), Hippocrepis and Trigonella (8 species each), the rest genera less than 8 species for each genus (Table 2).

Table 1. List of new records to the family Fabaceae for Flora of Libya

New records	Specimen plant collector
Pisum syriacum (Berg.) E. Lehm.	El- Gadi *et al*.,1987
Coronilla emerus L. subsp. *emeroides* (Boiss. & Sprun.) Hayek	El- Gadi *et al*.,1987
Astragalus massiliensis (Mill.) Lam.	Sherif *et al*., 1990
Vicia sericocarpa Fenzl	Sherif *et al*.,1990
Vicia hirsuta (L.) Gray	Alhabony, 1999
Retama monosperma (L.) Boiss. subsp. *bovei* (Spach) Maire	El-Mokassbi, 2014
Sesbania sesban (L.) Merr.	Erteeb and Sharashi, 2015

3. SPECIES DIVERSITY

One of the most important indices which are used for the evaluation of ecosystems at different scales is species diversity (Ardakani, 2004). Typical biodiversity measurement focuses on the species level and local diversity can be studied with various indices (Eshaghi, 2009); such as Simpson's index or species richness which are commonly used to assess different trends in plant diversity. Diversity values of Simpson's index are a range between 0 and 1; when the value closer to 1 it is more diverse and when it closer to 0 it is less diverse (Reich et al., 2001; Ket, 2012). In this study, Simpson's diversity index calculates a diversity score for the family Fabaceae; it is based on both the number of different species of each genus and the number of individuals present for each of those species (Table 2).

The formula for calculating Simpson's index is:

$$\text{Simpson's Diversity Index (D)} = 1 - \frac{\sum n_i(n_i - 1)}{N(N-1)}$$

Where N = the total number of all species in the family Fabaceae.
n_i = the numbers of species of each genus.

$\sum n_i (n_i-1) = 650 + 420 + 342 + 210 + 182 + (132 x2) + (56 x2) + 32+ (12 x3) + (6x 3) + (6x13) + (2x9)$
$= 2284$

$N (N-1) = 198 (198-1) = 39006$

Simpson's Diversity Index = 1- (2284/39006)
= 1- 0.058
= 0.942

Table 2. Shows the number of species depending on the genus in the Family Fabaceae

Genus	number of species (n_i)	(n_i-1)	$n_i(n_i-1)$
Astragalus	26	25	650
Trifolium	21	20	420
Medicago	19	18	342
Vicia	15	14	210
Lotus	14	13	182
Lathyrus	12	11	132
Ononis	12	11	132
Trigonella	8	7	56
Hippocrepis	8	7	56
Melilotus	6	5	32
Anthyllis	4	3	12
Crotalaria	4	3	12
Lupinus	4	3	12
Coronilla	3	2	6
Hedysarum	3	2	6
Pisum	3	2	6
Argyrolobium	2	1	2
Calicotome	2	1	2
Dorycnium	2	1	2
Ebenus	2	1	2
Genista	2	1	2
Indigofera	2	1	2
Onobrychis	2	1	2
Psoralea	2	1	2
Retama	2	1	2
Other 18 genera	1	0	0

4. LIFE FORMS

Depending on Raunkiaer's method (1934) which was modified by Govaerts *et al.,* (2000), the highest proportion was herbs annuals. From the results obtained, the shrubs are representative by 7.57%, while the trees only 1.01% (Table 3). This can be referred to as the difficulties for most species to grow in a dry habitat. Based on the results, figure 2 shows that the highest life form recorded was for the Therophytes which constituted 137 species representing (69.19%) of the total species followed by the Hemicryptophytes with 29 species representing (14.65%), Nanophanerophytes 15 species (7.57%), Therophytes / Hemicryptophytes 11 species (5.55%), Chaemephytes 4 species (2.02%) and Phanerophytes with 2 species (1.01%). Therophytes and Hemicryptophytes are the most frequent life forms which may indicate typical desert spectrum vegetation.

Table 3. Life forms of Fabaceae species

Life forms	No. of species	% of total species
Therophytes (T)	137	69.19
Hemicryptophytes (He)	29	14.65
Therophytes / Hemicryptophytes (T/He)	11	5.55
Chaemephytes (Ch)	4	2.02
Nanophanerophytes (NP)	15	7.57
Phanerophytes (P)	2	1.01

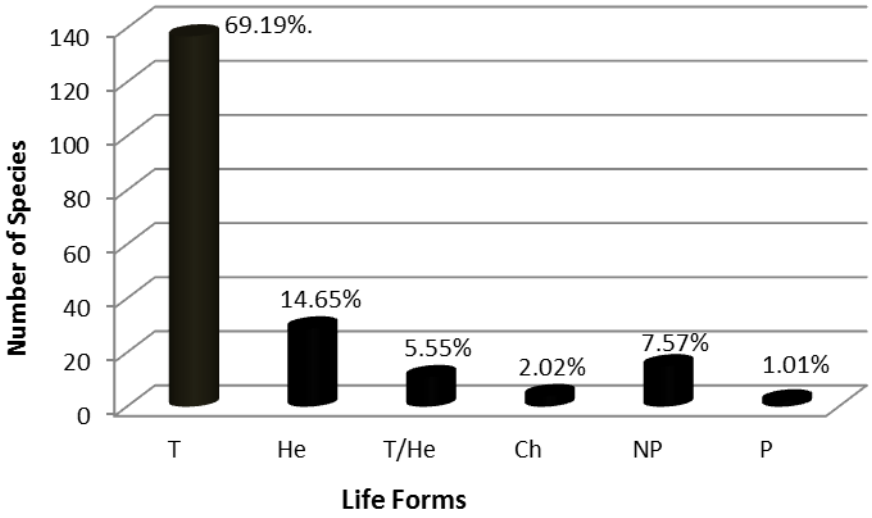

Figure 2. Shows the number of species and percentage of Life forms in the Family Fabaceae.

5. GEOGRAPHICAL ELEMENTS OF SPECIES LEVEL (CHOROTYPE)

The results obtained from the geographical distribution of the species showed that 115 species (58.1%) are dominated in the Mediterranean region (Table 4 & Figure 3). 17 species out of the total with a ratio of 8.6 % belong to Mediterranean /Irano-Turanian regions, 8.1% (16 species) belong to Saharo-Arabian region, 6.5% (13 species) belong to Euro - Siberian /Mediterranean/Irano-Turanian regions, Cosmopolitan and Tropical regions representative by 3% with 6 species each, 2% (4 species) belong to Mediterranean / Saharo-Arabian and Euro - Siberian /Mediterranean regions. Figure 4 shows the distribution of Fabaceae species depending on coordinates have been given by the flora of Libya.

Table 4. Geographical distribution (Chorotype) of Fabaceae species

Chorotype	No. of species	% of total species
Med	115	58.1
Sa-Ar	16	8.1
Med/ Sa-Ar	4	2.0
Med - Eu-Si	4	2.0
Med / Ir-Tu / Sa-Ar	1	0.5
Med / Ir-Tu	17	8.6
Ir-Tu	7	3.54
Ir-Tu - Sa-Ar	3	1.5
Sa-Ar/ Su	2	1.01
Eu-Si/ Med / Ir-Tu	13	6.5
Eu-Si	3	1.5

Sud	1	0.5
Trop	6	3.0
Cosmo	6	3.0

Abbreviations: Med = Mediterranean, Sa-Ar = Saharo-Arabain, Ir-Tu = Irano-Turanian, Eu-Si = European Siberia, Cosmo = Cosmopolitan, Sud= Sudanian. Trop= Tropical

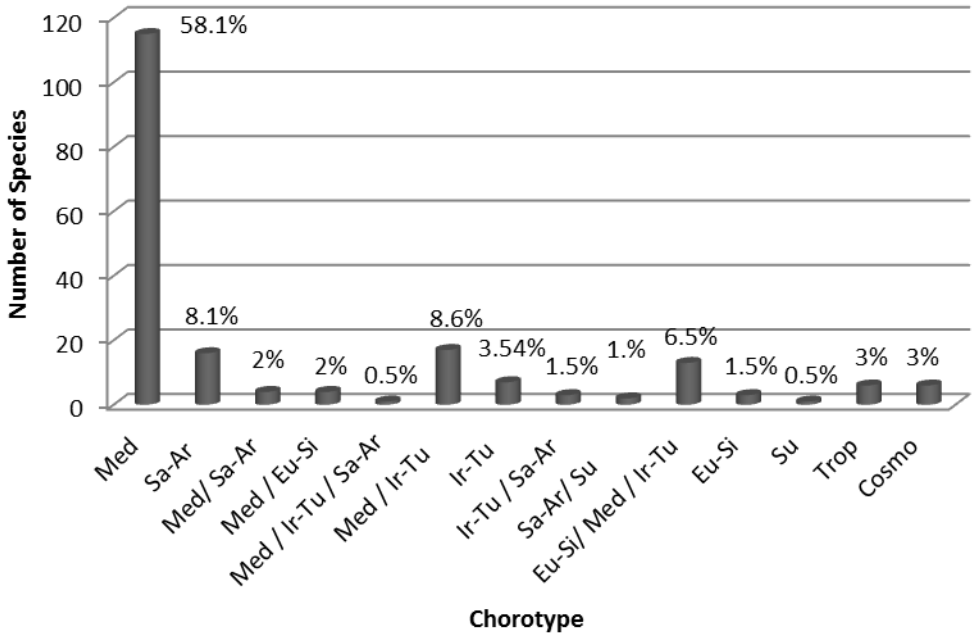

Figure 3. Geographical distribution of species showing number & percentage of species in each chorotype in the Family Fabaceae.

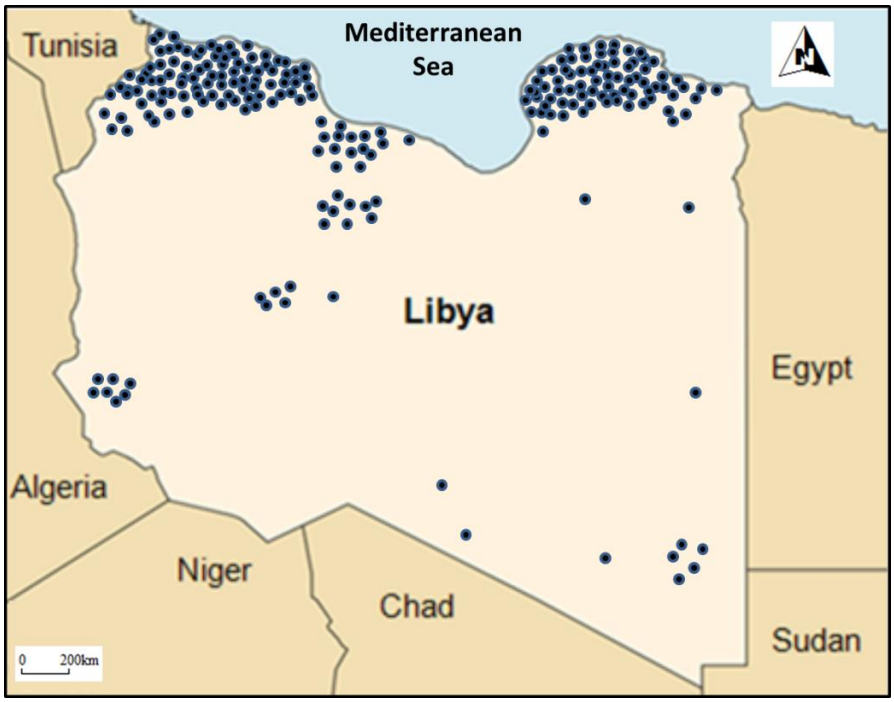

Figure 4. Distribution of Fabaceae species depending on the coordinate's flora of Libya.

6. DISCUSSION

Based on the results obtained from used Raunkiaer's method, the life form classes along the Family Fabaceae showed that the clear dominance of Therophytes (62.2%) followed by the Hemicryptophytes (14.65%). The structure of life forms indicates their compatibility with habitat conditions for the use of environmental resources in the habitat (Pairanj *et al.,* 2011). Therophytes are dominated due to the long dry periods during the year in Libya (El-Mokasabi, 2017). Simpson's Diversity index indicated that the Family Fabaceae has a high diversity. Our finding displayed that chorological characteristics of the Fabaceae species showed that Mediterranean region elements recorded the highest percentage (58.1%) followed by Mediterranean /Irano-Turanian regions elements (8.6%). The map of species distribution clearly shows that the majority of species of the Family Fabaceae are located within the Mediterranean region. It seems that annual and perennial life forms are a better strategy in the temperate deserts of Libya (AL Sghair et al., 2019).

7. CONCLUSION

This research set out to present the first floristic analysis and species diversity of the Family Fabaceae depending on species which are represented by voucher specimens and deposited at the National herbarium. Simpson's Diversity index indicated the Family Fabaceae that has a high diversity. The life forms and chorological spectra of plant species were resolute. There are few trees and shrubs species in our data; this can be referred to as the difficulties for most species to grow in a dry habitat. It seems that annual and perennial life forms are a better strategy in the temperate deserts of Libya. Therophytes displayed the maximum number of species with 69.19%. The map of species distribution clearly shows that the majority of species of the Family Fabaceae are located within the Mediterranean region.

Appendix

List of species which are represented by voucher specimens, Chorotype and Life From based on Jafari (1980)

Species	Chorotype	Life form
Alhagi graecorum Boiss.	Med - Ir-Tu	He
Anagyris foetida L.	Med - Ir-Tu	N
Anthyllis barba-jovis L.	Med	He
Anthyllis henoniana Coss. Ex Batt.	Med	He
Anthyllis tetraphylla L.	Med	T
Anthyllis vulneraria L.	W.Med	T/He
Arachis hypogea L.	Cosmo	T
Argyrolobium abyssinicum Jaub. & Spach.	Sa-Ar	Ch
Argyrolobium uniflorum (Decne.) Jaub. & Spach.	Sa-Ar/ Sud / Med	Ch
Astragalus annularis Forsk.	Sa-Ar	T
Astragalus asterias Stev. Ex Ledeb.	Med - Sa-Ar	T
Astragalus boeticus L.	Med	T
Astragalus caprinus L.	Sa-Ar	He
Astragalus corrugatus Bert.	W.Ir-Tu/Sa-Ar	T
Astragalus epiglottis L.	Med.	T
Astragalus eremophilus Boiss.	Sa-Ar / Su	T
Astragalus fruticosus Forsk.	Sa-Ar	He
Astragalus graecus Boiss.	Med	He
Astragalus hamosus L.	Med	T
Astragalus hauarensis Boiss.	Sa-Ar	T
Astragalus hispidulus DC.	Sa-Ar	T
Astragalus intercedens Sam. Ex Rech. F.	Sa-Ar	T
Astragalus kahiricus DC.	Sa-Ar	He

Astragalus macrocarpus DC.	Med	He
Astragalus massiliensis (Mill.) Lam	Trop	N
Astragalus peregrinus Vahl.	Sa-Ar	T
Astragalus pseudotrigonus Batt. Et Trab.	Sa-Ar	He
Astragalus schimperi Boiss.	Sa-Ar	T
Astragalus sinaicus Boiss.	Med	T
Astragalus spinosus (Forsk.) Muschler.	Ir-Tu	Ch
Astragalus stella Gouan.	Med	T
Astragalus taubertianus Aschers. & Barbey.	Med	T/He
Astragalus tribuloides Del.	Ir-Tu - Sa-Ar	T
Astragalus trigonus DC.	Med	He
Astragalus vogelii (Webb) Bornm.	Med/Ir-Tu	T
Biserrula pelecinus L.	Med	T
Calicotome spinosa (L.) Link.	Med	N
Calicotome villosa (Poiret) Link.	Med.	N
Cicer arietinum L.	S&E Med.	T
Coronilla emerus L.	Med	P
Coronilla repanda (Poir.) Guss.	Med	T
Coronilla scorpioides (L.) Koch.	Eu-Si/Med/Ir-Tu	T
Crotalaria arenaria Benth.	Trop	Ch
Crotalaria juncea L.	Cosmo	T
Crotalaria saharae Coss.	Med	Ch
Crotalaria thebaica (Del.) DC.	Sa-Ar	Ch
Dorycnium hirsutum (L.) Ser.	Med	He
Dorycnium rectum (L.) Ser.	Med	He
Ebenus armitagei Schweinf. Et Traub.	Med	Ch
Ebenus pinnata Ait.	Med	He
Factorovskya aschersoniana (Urb.) Eig.	Med	T
Genista acanthoclada DC.	Med	Ch
Genista microcephala Coss. & Dur.	Med	N
Glyeyrrhiza glabra L.	Eu-Si/Med/Ir-Tu	He
Hedysarum coronarium L.	Med	He
Hedysarum glomeratum F.G. Dietrich.	Med	T
Hedysarum spinosissimum L.	Med	T
Hippocrepis bicontorta Loisel.	Med - Sa-Ar	T
Hippocrepis ciliata Willd.	Med	T
Hippocrepis cyclocarpa Murb.	Med	T
Hippocrepis multisiliquosa L.	Med.	T
Hippocrepis scabra DC.	Med	He
Hippocrepis unisiliquosa L.	Medi	T
Hippocrepis unisiliquosa L.	Med	T
Hippocrepis unisiliquosa L.	E.Med	T
Hymenocarpos circinatus (L.) Savi.	Med.	T
Indigofera semhaensis Vierh.	Ir-Tu	T
Indigofera sessiliflora DC.	Ir-Tu	T

Lablab purpureus (L.) Sweet.	Cosmo	T/He
Lathyrus annuus L.	Med / Eu-Si	T
Lathyrus aphaca L.	Eu-Si / Med / Ira-Tu	T
Lathyrus cicera L.	Med/Ir-Tu	T
Lathyrus clymenum L.	Med	T
Lathyrus gorgonei Parl.	Med	T
Lathyrus hierosolymitanus Boiss.	Med	T
Lathyrus ochrus (L.) DC.	Med	T
Lathyrus odoratus L.	Med	T
Lathyrus pseudocicera Pamp.	Med	T
Lathyrus sativus L.	Med/Ir-Tu	T
Lathyrus saxatilis (Vent.) Vis.	Med	T
Lathyrus setifolius L.	Med	T
Lens culinaris Medic.	Med	T
Lotononis platycarpos (Viv.) P.Sermolli.	Sa-Ar/Su	T
Lotus collinus (Boiss.) Heldr.	Med	He
Lotus conimbricensis Brot.	Med	T
Lotus corniculatus L.	Eu-Si / Med / Ir-Tu	He
Lotus cytisodies L.	Med	Ch
Lotus edulis L.	Med	T
Lotus gebelia Vent.	Ir-Tu	He
Lotus glinoides Delile.	Su	T
Lotus halophilus Boiss. & Spruner .	Med	T
Lotus jolyi Batt.	Sa-Ar	He
Lotus ornithopodioides L.	Med	T
Lotus peregrinus L.	Med	T
Lotus polyphyllus Clarke.	Med	He
Lotus suaveolens Pers.	Med/Eu-Si	T/He
Lotus uliginosus Schkur.	Med/Eu-Si	He
Lupinus albus L.	Med	T
Lupinus angustifolia L.	Med	T
Lupinus micranthus Guss.	Med	T
Lupinus varius L.	Med	T
Medicago arabica (L.) Hudson.	Med	T
Medicago coronata (L.) Bart.	Med	T
Medicago cyrenaica Marie & Weill.	Med	T
Medicago disciformis DC.	Med	T
Medicago falcata L.	Ir-Tu	He
Medicago laciniata (L.) Mill.	Sa-Ar	T
Medicago littoralis Rohde ex Loisel.	Med	T
Medicago lupulina L.	Eu-Si / Med / Ir-Tu	He
Medicago marina L.	Med	Ch
Medicago minima (L.) Bartal.	Med / Eu-Si	T
Medicago murex Willd.	Med	T
Medicago orbicularis (L.) Bartal.	Med / Ir-Tu	T

Medicago polymorpha L.	Eu-Si / Med / Ir-Tu	T
Medicago rigidula (L.) All.	Med	T
Medicago rugosa Desr.	Med	T
Medicago sativa L.	Eu-Si / Med / Ir-Tu	He
Medicago tornata (L.) Mill.	Med	T
Medicago truncatula Gaertn.	Med	T
Medicago turbinata (L.) All.	Med	T
Melilotus albus Medik.ex Desr.	Eu-Si / Med / Ir-Tu	T
Melilotus indicus (L.) All.	Med	T
Melilotus italicus (L.) Lam.	Med	T
Melilotus messanensis (L.) All.	Med	T
Melilotus officinalis (L.) Pall.	Eu-Si	T
Melilotus sulcatus Desf.	Med	T
Onobrychis caput-galli (L.) Lam.	Med	T
Onobrychis crista-galli (L.) Lam.	Sa-Ar	T
Ononis angustissima Lam.	W.Med	Ch
Ononis hispida Desf.	Med	Ch
Ononis natrix L.	Med	Ch
Ononis ornithopodioides L.	Med	T
Ononis pendula Desf.	Med	T
Ononis reclinata L.	Med / Ir-Tu	T
Ononis serrata Forsk.	Med / Sa-Ar	T
Ononis sicula Guss.	Med / Ir-Tu / Sa-Ar	T
Ononis spinosa L.	Med / Ir-Tu	Ch
Ononis vaginalis Vahl.	Med	Ch
Ononis variegata L.	Med	T
Ononis viscosa L.	Med	T
Phaseolus vulgaris L.	Cosmo	T
Pisum elatius M. Bieb.	Med/Ir-Tu	T
Pisum syriacum (Berg.) E. Lehm.	Ir-Tu	T
Pisum sativum L.	Ir-Tu	T
Psoralea bituminosa L.	Med	He
Psoralea plicata Delile.	Cosmo	N
Retama monosperma (L.) Boiss.	Med	N
Retama raetam (Forsk.) Webb & Berth.	Sa-Ar/ Ir-Tu	N
Scorpiurus muricatus L.	Med	T
Spartidium saharae (Coss. Dur.) Pomel.	Med	N
Sesbania sesban (L.) Merr.	Trop	P
Spartium junceum L.	Med	N
Tetragonolobus purpureus Moench.	Med	N
Trifolium alexandrinum L.	Med	T
Trifolium angustifolium L.	Med	T
Trifolium arvense L.	Eu-Si / Med / Ir-Tu	T
Trifolium campestre Schreb.	Med	T
Trifolium cherleri L.	Med	T

Trifolium dasyurum C. Presl.	Med	T
Trifolium fragiferum L.	Eu-Si / Med / Ir-Tu	He
Trifolium isthmocarpum Brot.	W.Med	T
Trifolium lappaceum L.	Med	T
Trifolium leucanthum M. Beib.	Med	T
Trifolium micranthum Viv.	Trop	T
Trifolium nigrescens Viv.	Med	T
Trifolium purpureum Lois.	Med	T
Trifolium resupinatum L.	Med / Ir-Tu	T
Trifolium scabrum L.	Med	T
Trifolium stellatum L.	Med	T
Trifolium strictum L.	Eu-Si	T
Trifolium subterraneum L.	Med	T
Trifolium suffocatum L.	Med	T
Trifolium tomentosum L.	Eu-Si / Med / Ir-Tu	T
Trifolium uniflorum L.	Med	He
Trigonela monspeliaca L.	Eu-Si	T
Trigonella angunia Delile.	Med/Ir-Tu	T
Trigonella coerulescens (Bieb.) Halacsy.	Med/Ir-Tu	T
Trigonella foenum-graecum L.	Med	T
Trigonella gladiata Stev.	Med	T
Trigonella laciniata L.	Med	T
Trigonella maritima Delile ex Poiret.	Med	T
Trigonella stellata Forsk.	Sa-Ar	T
Vicia ervilia (L.) Willd.	Med/Ir-Tu	T
Vicia faba L.	Cosmo	T
Vicia hybrida L.	Med	T
Vicia hirsuta (L.) Gray	Trop	T
Vicia laxiflora Brot.	Med	T
Vicia lutea L.	Med	T
Vicia monantha Retz.	Med / Ir-Tu	T
Vicia narbonensis L.	Med	T
Vicia pannonica Crantz.	Med/Ir-Tu	T
Vicia peregrina L.	Med / Ir-Tu	T
Vicia sativa L.	Med	T
Vicia sicula (Rafin) Guss.	Med	He
Vicia sericocarpa Fenzl	Med/Ir-Tu	T
Vicia tetrasperma (L.) Scherb.	Eu-Si/ Med / Ir-Tu	T
Vicia villosa Roth.	Eu-Si/ Med / Ir-Tu	T
Vigna unguiculata (L.) Walp.	Trop	T

Conflicts of interest

The authors declare that there are no conflicts of interest.

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