International Journal of Botany Studies
ISSN: 2455-541X; Impact Factor: RJIF 5.12
Received: 09-08-2019; Accepted: 11-09-2019
www.botanyjournals.com
Volume 4; Issue 6; November 2019; Page No. 51-56

Economic importance of multi- purpose plants in al-jabal al-akhdar, Libya

Rabeia A Almajdoub[1], Abdullah F Abogmaza[2], Mohamed A Alaib[3*]
[1] Botany Department, Faculty of Science, University of Benghazi, Libya
[2-3] Botany Department, Faculty of science, University of Al- Asmarya, Libya

Abstract
In this study 40 wild plant species distributed in different elevations [0-200 (1st Plateau), 200-400 (2nd Plateau), 400 < m.s.l (3rd Plateau)] in Al-Jabal Al-Akhdar region were listed and considered as multi- purpose plants. These species belong to 37 genera, distributed on 27 families; two families belong to gymnosperms and the remaining 25 families belong to Angiosperms; 20 families of Dicotyledons and 5 families of Monocotyledons. The recorded species represent different life forms; 20 species of Phanerophytes (50%), 13 species of Chamaephytes (32.5%), 6 species of Cryptophytes (15%) and one species of Hemicryptophytes (2.5%). These species also represent different growth forms; 11 species of trees and tall shrubs (27.5%), 14 species of dwarf shrubs (35%), 4 species of climbers (10%), 11 species of perennial herbs (27.5%). In addition, among the recorded species 6 endemic species, 15 species considered as potential source of nectar for honeybees and 30 species of aromatic and medicinal plants.

Keywords: sustainable, wild, multi-purpose, conservation, endemic, economic

Introduction
Al Jabal Al-Akhdar is an important plant area situated northeast of Libya (Fig1). It is the richest place for wild plants in Libya with 1400 species. Half of Libya's endemic plants grow only there (Radford *et al.*, 2011) [57]. Considerable number of the species growing in this area are multipurpose plants (El-Mokasabi, 2017) [17]. The main threats to the plants in the region include overgrazing (67% of sites are affected), deforestation, tourist development, intensive arable farming, unsustainable collection of plants for medicine and culinary uses, road construction, urbanization and fire (Elshatshat, 2014) [18].

Aim of the study
Because of lack of information about multipurpose plant species in Al-Jabal Al-Akhdar region and the extent of their use and importance, especially statistics, concerning their number, classification and economic value. Therefore the aims of this work came to fill these gaps to help decision makers to develop the vital strategy for their protection and utilization.

Fig 1: A map showing the study area

Site description

Location: The study area (Al – Jabal Al-Alkhdar) is located on the eastern part of Libya. It lies between 20 45'00" and 23 01'42" E longitude and 32 35'00" and 3*3* 01'15" N latitude. The area rises to about 800 m above the sea level (Fig.1) (Alaib *et al*., 2017) [1].

Physiography: According to physiographic features, the study area can be divided morphologically into three parts:

The Upper plateau (more than 400 m above sea level). The middle plateau (200-400 m above sea level). And the lower plateau (0-200 m above sea level) (Alaib *et al*., 2017) [1].

Soils: The influence of the soil genesis factors, such as climate, vegetation and parent material is more or less reflected in the profile characteristics of the soils. In general the area are composed of Eocene rocks (Tertiary) which consist of nummulitic limestone in part chalky, marly and cherty, while quaternary deposits occur mainly on the coastal plain mostly, along the slopes of the hills namely Colluvium and in the Wadi bottoms namely Alluvium. The major soil types found in the area are, terrarossa is dominant in the upper plateau and alluvium loam-clayey in the bottom, while eolian sand area soil dominate at the narrow area along coastal plain (Al-hummidi, 1999) [3].

Climate: The climatic conditions prevailing in the study area, has Mediterranean climate. Cyclonic rains occur in winter, and the hot, dry summer is a result of high- pressure zone. The main characteristics of the climate in this area are instability caused by the contrary effects of the Sahara and the sea.

The rainfall in the study area is markedly seasonal and irregular in amount. The annual rainfall at the area varies considerably around the mean from one month to another, year to year. Most of the rainfall occurs in late autumn and early spring (during the period between Octobers a March). The peak rainy months are December, January and February. In general, the rainfall starts in October or September and extends up to March sometimes up to April. It was low as 295.1 mm and as high as 648 mm. The annual mean about 418.6 mm.

Temperature varied considerably from summer to winter. In general, the winter extends from December to March but December, January and February are the coolest months and the summer extends from May to August; June and July being the hottest months of the year. The monthly mean temperature varies; it is 7.2 C° in February and 29.8C° in June.

The relative humidity in general was high in the study area. The monthly. mean however, varies from 53.3% (June)to 76.6% January, February, December and November are the most humid months of the year, where the relative humidity is above 70.9% as the maximum and the minimum below 54.3% in May and June.

In Al-Jabal Al-Akhdar, variations in wind velocity are less distinct than those of other climatic features. The northern and northwestern wind is dominant in the study area. It is humid wind, make the air cooler in the winter, and brings the rain. While the southern and south- western winds in summer make the air warmer. The average wind speed of The study area varies from 8.3 Km/h (October) to 11.1Km/h (April) (Al-hummidi, 1999) [3].

Field trips

Field trips were carried out to the sites marked on the map during the period between March and April, 2015-2016. During this period, most of plants are in flowering condition. We did not collect any plant samples from the site, we had only investigated, identified, and took photographs of the plants in the site to avoid destruction of vegetation. The identification of the specimens was done by utilization of available taxonomic literature in particular Flora of Libya (Alavi, 1983; Ali, 1976; Ali, 1977a; Ali, 1977b; El-Gadi, 1977; El-Gadi, 1978a; El-Gadi, 1978b; Jafri, 1977a; Jafri, 1977b; Jafri, 1977d; Jafri, 1978; Labani, and El-Gadi, 1980; Qaiser, and Siddiqi, 1984; Siddiqi,1977b; Siddiqi,1978a; Siddiqi, 1978b; Siddiqi, 1983; Siddiqi, 1985) [2, 4, 5, 6, 13-15, 29-32, 34, 56, 62-65].

Results and Discussion

In this study 40 wild Multi- purpose plant species distributed on different elevations [0-200 (1st Plateau), 200-400 (2nd Plateau), 400 < msl (3rd Plateau)] in Al-Jabal Al-Akhdar region were listed. These species belong to 38 genera, distributed on 26 families; two families belong to gymnosperms and the remaining 24 families belong to angiosperms; 18 families of Dicotyledons and 6 families of Monocotyledons (Table 1).

Table 1: Plant groups in the study area.

Plant Groups		Families	Genera	Species
Gymnosperms		2	3	3
Angiosperms	Monocotyledons	5	7	7
	Dicotyledons	20	27	30
Total		27	37	40

The recorded species represent different life forms; 20 species of Phanerophytes (50%), 13 species of Chamaephytes (32.5%), 6 species of Cryptophytes (15%), and one specie of Hemicryptophytes (2.5%) (Table 2).

Table 2: Life forms of Multi- purpose plant species in the study area.

No	Life Form	Number of Species	%
1	Phanerophytes	20	50.0
2	Chamaephytes	13	32.5
3	Cryptophytes (Geo.)	6	15.0
4	Hemicryptophytes	1	2.5
Total		40	100

In addition, among the recorded species 6 endemic species, 16 species considered as potential source of nectar for honeybees and 31 species of aromatic and medicinal plants (Table 3). The obtained data also revealed that there were 8 among the 40 species recorded in this study have high economic value. These species include; *Cupressus sempervirens* L. var.*horizontalis* (Mill.) Gord., *Ceratonia siliqua* L., *Arbutus pavarii* Pamp., *Capparis spinosa* L.

subsp. *orientalis* var. *orientalis*, *Spartium junceum* L., *Rosmarinus officinalis* L., *Salvia fruticosa* Mill., and *Narcissus tazetta* L. which should be given the priority in any conservation program, since these species considered as a target for direct exploitation such as over grazing, collection for medicinal uses by local people, or their habitats expose to destruction through deforestation, farming expansion, road construction and urbanization.

Table 3: Multi-purpose plant species collected from the study area and their uses.

No	Species	Economic Value	Status in Libya	Reference
1	*Juniperus phoenicea* L.	OP, AP, IP, HeP	Native	(Louhaichi,2011) [35]
2	*Cuperessus sempervirens* L. var. *horizontalis* (Mill.) Gord.	OP, AP, MP, IP, AFFP, TU, Con	Endemic	(El-Darier, 2009) [12] (Louhaichi, 2011)
3	*Pinus halepensis* L. (Miller)	OP, HeP, AFFP, Con	Native	**(**Al-humidi**,** 1999) [3]
4	*Ceratonia siliqua* L.	MP, OP, AF, FP, IP, SHP, SN	Native	(Louhaichi, 2011) [35] (PFAF, 2016b)
5	*Pistacia lentiscus* L.	OP, AF, MP, FP, IP	Native	(Louhaichi, 2011) [35]
6	*Viburnum tinus* L.	MP, OP, HeP, PG	Native	(Louhaichi, 2011) [35] (ElMokasabi, 2014) [16] (PFAF, 2016c)
7	*Phillyrea angustifolia* L.	OP, AP	Native	(Louhaichi, 2011) [35]
8	*Quercus coccifera* L.	OP, SN, HeP	Native	(PFAF,2016d)
9	*Arbutus pavarii* Pamp.	MP, OP, AF, HF, SN, Ta, Con	Endemic	(El-Darier, 2009) [12] (Louhaichi, 2011) [35]
10	*Nerium oleander* L.	MP, OP, HeP	Native	Gardening, 2016) Sinha, 2016) [67]
11	*Periploca laevigata* Ait.	MP, OP, AF, Gr, SS.		(Louhaichi, 2011) [35] (DSS, 2014) [11]
12	*Clematis montana* L.	OP, SHB,WB	Native	Wright,1981) [69]
13	*Clematis vitalba* L.	MP, OP,AF, BSh	Native	(ISSG, 2016) [28]
14	*Smilax aspera* L.	MP, OP,AF, BSh	Native	PFAF,2016e)
15	*Lonicera etrusca* Santi	MP, AP, OP, SN, AF.		(Louhaichi, 2011) [35] (El-Mokasabi, 2017) [17]
16	*Myrtus communis* L.	MP, OP, AP, FP, PG	Native	(Louhaichi, 2011) [35]
17	*Laurus nobilis* L.	MP, OP, HF, HeP	Native	Nourbakhsh & Bal, 2005) [38]
18	*Fumana thymefolia* (L.) Spach.	MP OP, SF	Native	(Bidak, 2015) [7]
19	*Cistus parviflorus* Lam.	MP,OP, Ta, FT, PG	Native	(El-Mokasabi, 2014) [16]
20	*Cistus salvifolius* L.	OP, IP, FT, HeP, PG	Native	(El-Mokasabi, 2014) [16]
21	*Cistus incanus* L.	MP OP, TU, AP, PG	Native	(Papaefthimiou, 2014) [41]
22	*Capparis spinosa* L. subsp. orientalis var. orientalis	MP, OP, AF, HF, EC, SN, TU	Native	(El-Darier, 2009) [12] (Louhaichi, 2011) [35] (El-Mokasabi, 2014) [16] (Bidak, 2015) [7]
23	*Limoniastrum monopetalum* (L.) Boiss.	MP, OP, FP, Re, SF	Native	(Bidak, 2015) [7]
24	*Spartium junceum* L.	MP, OP, AF, AP, SN, Dy, IP	Native	(Louhaichi, 2011) [35]
25	*Phlomis floccosa* D.Don	MP, OP, WB, SS, SN	Native	(Louhaichi, 2011) [35] (Bidak, 2015) [7]
26	*Prasium majus* L.	MP, OP, AP, IP, Re, FP	Native	(Bidak, 2015) [7]
27	*Rosmarinus officinalis* L.	OP, IR, Re, SF, WB, Gr, SN	Native	(Bidak, 2015) [7] (E.O.C, 2012)
28	*Salvia fruticosa* Mill.	MP, OP, AP, IP, HF, PG	Native	(Louhaichi, 2011) [35]
29	*Satureja thymbra* L.	MP, OP, AP, SN, HF	Native	(PFAF, 2016)
30	*Ballota andreuzziana* Pamp.	OP, SN, HeP	Endemic	(El-Darier, 2009) [12]
31	*Helichrysum stoechas* L. (Moench)	MP, OP	Native	(El-Mokasabi, 2014) [16]
32	*Centaurea ragusina* L.	MP, OP, SN	Native	(gimcw, 2016) [20]
33	*Cyclamen rohlfesianum* (Aschers)	MP, OP, TU	Endemic	(El-Darier, 2009) [12] (El-Mokasabi, 2014) [16]
34	*Crocus boulosii* (Greuter)	OP, Dy	Endemic	(El-Darier, 2009) [12]
35	*Iris sisyrinchium* L.	OP, CF	Native	(PFAF, 2016)
36	*Arum cyrenacium* (Hruby)	OP, MP, HF	Endemic	(El-Darier, 2009) [12]
37	*Asphodelus microcarpus* (Viv)	OP, CF	Native	(PDN, 2016) [42]
38	*Urginea maritima* L.	MP, MP, OP, Re, SF	Native	(Bidak, 2015) [7]
39	*Narcissus tazetta* L.	MP, OP, AP, CF, Gr, WB	Native	(Bidak, 2015) [7]
40	*Convolvulus althaeoides* L.	MP, OP, Gr, SF	Native	(Bidak, 2015) [7]

Abbreviations: OP, Ornamental Plant; Gr, Grazing; MP, Medicinal Plant; AP, Aromatic source; IP, Industry Plant; HF, Human Food; AF, Animal Feed; FP, Fuel Plant; Ta, Tanning; Dy, Dyes; WB, Windbreak; FT, Filler Trees; Re, refuge; BSH, Bird Shelter; Sf, Sand Fixation; EC, Erosion Control; SS, Soil Stabilization; SHP, Shade Plant; Con, Construction; AFFP, Afforestation; HeP, Hedge Plant; PG, Pollen grain; SN, Source of Nectar; CF, Cut Flower; IR, Insect Repellent; TU, Traditional Use**.**

Fig 2: [1] *Helichrysum stoechas* L (Moench); [2] *Clematis vitalba* L ; [3] *Prasium majus* L.; [4] *Phlomis floccosa* D.Don; [5] *Spartium junceum* L.; [6] *Periploca laevigata* Ait ; [7] *Lonicera etrusca* Santi; [8]*Cyclamen rohlfesianum* (Aschers); [9] *Narcissus tazetta* L. ; [10] *Arum* cyrenacium (Hruby) ; [11] *Salvia fruticosa* Mill.

Conclusion

As far as the authors know there is no information available about multipurpose plant species, the extent of their use and importance, especially statistics, concerning their number, classification and economic value concerning the flora of Al-Jabal Al-Akhdar region. Therefore, the aims of this work was to fill these gaps to help decision makers to develop vital strategy for their protection and utilization. As the results show we have been able to record 40 multipurpose plant species distributed on different elevations in the study area and describe their economic values. Among the recorded species 6 endemic species, 16 species considered as potential source of nectar for honeybees and 31 species of aromatic and medicinal plants. The obtained data also revealed that there were 8 among the 40 species recorded in this study have high economic value, which should be given the priority in any conservation program, since these species considered as a target for direct exploitation such as over grazing, collection for medicinal uses by local people, or their habitats expose to destruction through deforestation, farming expansion, road construction and urbanization.

References

1. Alaib Mohamed A, Immhemed El-Sherif, Ramadana I. Floristic and ecological investigation of Wadi Al-Agar in Al-Jabal Al- Akhdar-Libya. Journal of Science & its applications. 2017; 5:1, 57-61.
2. Alavi SA. Flora of Libya. Vol. 107 (Asteraceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1983.
3. Al-humidi I. Floristic and Ecological Study of vegetation of Wadi Al-Agar. M.Sc thesis, Botany department, Faculty of Sience, Garyounis University, 1999.
4. Ali SI. Flora of Libya. Vol. 1 (Primulaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1976.
5. Ali SI. Flora of Libya. Vol. 9 (Asclepiadaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1977a.
6. Ali SI. Flora of Libya. Vol. 24 (Caprifolaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1977b.
7. Bidak Laila, Kamal M, Sania A, Halmy Marwa, Waseem A, Heneidy Selim Z. Goods and services provided by native plants in desert ecosystems: Examples from the northwestern coastal desert of Egypt. Global Ecology and Conservation. 2015; 3:433-447.
8. Boyle TH. The genetic resources of Latin America's herbaceous ornamental crops– vital to commercial floriculture. Diversity. 1991; 7:50-51.
9. CF (Cretan Flora), 2016, http://www.cretanflora.com/cistus_salviifolius.html
10. CF (Cretan Flora), 2016, http://www.cretanflora.com/fumana_thymifolia.html
11. DSS (Dryland Systems Solutions). ICARDA (ICARA's Rangeland Ecology and Managemant Unit), 2014. http://www.icarda.org/sites/default/files/Periploca_Shrub_Factsheet_2.pdf
12. El-Darier SM, El-Mogaspi FM. Ethnobotany and Relative Importance of Some Endemic Plant Species at El-Jabal El-Akhdar Region (Libya).World Journal of Agricultural Sciences. 2009; 5(3):353-360.
13. El-Gadi A. Flora of Libya. Vol. 41 (Araceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1977.
14. El-Gadi A. Flora of Libya. Vol. 51 (Amaryllidaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1978a.
15. El-Gadi A. Flora of Libya. Vol. 57 (Liliaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1978b.
16. El-Mokasabi Farag M. Floristic Composition and Traditional Uses of Plant Species at Wadi Alkuf, Al-Jabal Al-Akhder, Libya. American-Eurasian J. Agric. & Environ. Sci. 2014; 14(8):685-697.
17. El-Mokasabi Farag M. Taxonomy and Ethnobotany of Trees and Shrubs in Eastern Region of Libya. ContROL; 1:0009, 2017. DOI: https://dx.doi.org/10.28915/control.0009.1
18. Elshatshat S, Mansour A. Disturbance of flora and vegetation composition of Libya by human impacts: Costal Region of Al-Jabal Al-Akhdar area as model. Advances in Applied Science Research. 2014; 5(5):286-292.
19. Essential Oil Crops. Production guidelines for rosemary, 2012. www.daff.gov.za/publications
20. Gardening in mediterranean climates worldwide, 2016, Centaurea ragusina. http://gimcw.org/plants/profile.cfm?name=Centaurea.ragusina
21. Gardening KH, (Gardening Know How). Oleander

Privacy Hedge Tips On Planting Oleander as a Hedge, 2016, https://www.gardeningknowhow.com/ornamental/shrubs/oleander/planting
22. GP (Grow Plants) *Laurus nobilis* L, 2016. http://www.growplants.org/growing/laurus-nobilis
23. Halevy AH. Introduction of native Israeli plants as new cut flowers. In: IV International Symposium on New Floricultural Crops. Acta Horticulturae. 2000; 541:79-82.
24. Hegazy AK, Boulos L, Kabiel HF, Sharahy OS. Vegetation and Species Altitudinal Distribution in AL-Jabal AL-Akhdar Landscape, Libya. Pak. J. Bot. 2011; 43(4):1885-1898.
25. Heneidy SZ. Rangelands in Arid Ecosystem. Department of Botany and Microbiology, Faculty of Science, Alexandria University Egypt. 2012; 978-953-51-0572-5.
26. Heywood VH. Medicinal and aromatic plants as global resources. In: Proceedings of the 2nd World Congress on Medicinal and Aromatic Plants for Human Welfare. Acta Horticulturae. 1999a; 500:21-29.
27. hortipedia (The GardenInfoPortal). Centaurea ragusina. Accessed August, 2013. http://de.hortipedia.com/wiki/Centaurea_ragusina http://web03.bruns.de/bruns/en/EUR//Pflanzen/VIBURNUM-tinus-L-,-Laurustinus/p/1930
28. ISSG (Invasive Species Speciolist Group). *Clematis vitalba*, 2016. http://www.iucngisd.org/gisd/species.php?sc=157
29. Jafri, S.M.H. (1977a). Flora of Libya. Vol. 12 (Capparaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya.
30. Jafri SMH. Flora of Libya. Vol. 27 (Fagaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1977b.
31. Jafri SMH. Flora of Libya. Vol. 48 (Cistaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1977d.
32. Jafri SMH. Flora of Libya. Vol. 61 (Caesalpiniaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1978.
33. Jones RB. New ornamental crops in Australia. In Acta Horticulturae. 1995; 397:59-70.
34. Labani RM, El-Gadi A. Flora of Libya. Vol. 81 (Iridaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli – Libya, 1980.
35. Louhaichi M, Salkini AK, Estita HE, Belkhir S. Initial Assessment of Medicinal Plants Across the Libyan Mediterranean Coast. Advances in Environmental Biology. 2011; 5(2):359-370.
36. McDonald M. Gene bank proposed. Ohio Floriculture Online, 1996. www.ag.ohiostate. edu/~flori/archive/aug96/genebnk.html
37. MPW (Monterey Peninsula Wildflowers), Shrubs & Trees, 2016 https://montereywildflowers.com/Cistaceae.php
38. Nourbakhsh, Bal Yaliz. Recovery of fixed and volatile oils from laurus nobilis l. fruit and leaves by solvent extraction method. Eng. & arch. Fac. eskişehir osmangazi university, 2005, xviii (2).
39. NWCB (Noxious Weed Control Board, *Spartium juniceum*, 2016. http://www.nwcb.wa.gov/weeds/spanish-broom
40. Okhawa K. Flower industry in northeast Asia: development and introduction of new crops. p. In: IV International Symposium on New Floricultural Crops. Acta Horticulturae. 2000; 541:125-133.
41. Papaefthimiou Dimitra, Papanikolaou Antigoni, Falara Vasiliki, Givanoudi Stella, Kostas Stefanos, Kanellis AK. Genus Cistus: a model for exploring labdane-type diterpenes' biosynthesis and a natural source of high value products with biological, aromatic, and pharmacological properties. Journal List Front Chem. 2014; V.2:PMC4052220.
42. PDN (Plant Delights Nursey, Inc). *Asphodelus microcarpus*, 2016, http://www.plantdelights.com/Asphodelus-aestivus-for-sale/Buy-Turkish-Asphodel/
43. Pertwee J. International Floriculture Trade Statistics 1999 Researched, Compiled and Written by Jeremy Pertwee, Pathfast Publishing 31 Second Avenue, Frinton-on- Sea, Essex CO13 9ER, United Kingdom, 1999.
44. PFAF (Plants for a Future). *Ceratonia siliqua* - L, 2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Ceratonia+siliqua
45. PFAF (Plants for a Future). *Gynandriris sisyrinchium* - (L.)Parl,2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Gynandriris+sisyrinchium
46. PFAF (Plants for a Future). Gynandriris sisyrinchium - (L.)Parl,2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Gynandriris+sisyrinchium
47. PFAF (Plants for a Future). *Quercus coccifera* – L, 2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Quercus+coccifera
48. PFAF (Plants for a Future). *Salvia fruticosa* – Mill, 2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Salvia+fruticosa
49. PFAF (Plants for a Future). *Smilax aspera* – L, 2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Smilax+aspera
50. PFAF (Plants for a Future). *Viburnum tinus* –L, 2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Viburnum+tinus
51. PFAF (Plants for a Future). *Viburnum tinus* –L, 2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Viburnum+tinus
52. PFAF (Plants for A Future), 2016. *Satureja thymbra*.http://www.pfaf.org/user/Plant.aspx?LatinName=Satureja+thymbra
53. PFAF (Plants for a Future). L. Convolvulus tricolor, 2016.http://www.pfaf.org/user/Plant.aspx?LatinName=Convolvulus+tricolor
54. Plant Word Seeds, 2016. *Romulea bulbocodium* http://www.plant-world-seeds.com/store/view_seed_item/2379
55. Plummer JA, Considine JA, Yan G, Hall D, Alford T, Seaton K *et al*. p. New developments from the Centre for Australian Plants. In: IV International Symposium on New Floricultural Crops. Acta Hort. 2000; 54:37-47.
56. Qaiser M, Siddiqi MA. Flora of Libya. Vol. 109 (Plumbaginaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli-Libya, 1984.
57. Radford EA, Catullo G, Montmollin B. Important Plant Areas of the south and east Mediterranean region. Priority sites for conservation, (section 3) ISBN 978-2-

8317-1337-3, 2011.
58. Rhizopoulou S, Lykos A, Delipetrou P, Vallianatou I. Living collection of *flora graeca* sib thorpia nal from the foli os of the monumental edi tion to the beds of a botanic garden in greece. The Journal of Botanic Garden Horticulture, No. 10, 2012.
59. RHS (Royal Horticultural Society). *Phillyrea angustifolia*,2016.https://www.rhs.org.uk/Plants/24488/Phillyrea-angustifolia/Details
60. Rock garden plants. *Phlomis Floccosa* D. Don. Version 7.0, 2013. http://flora.kadel.cz/e/kvCard.asp-Id=5945.htm
61. Sawyer J, Inman F. *Clematis* in Wellington Conservancy Current status and future management, 2006.
62. Siddiqi MA. Flora of Libya. Vol. 45 (Convolvulaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli-Libya, 1977b.
63. Siddiqi MA. Flora of Libya. Vol. 52 (Anacardiaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli-Libya, 1978a.
64. Siddiqi MA. Flora of Libya. Vol. 54 (Ericaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli-Libya, 1978b.
65. Siddiqi MA. Flora of Libya. Vol. 98 (Apocynaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli-Libya, 1983.
66. Siddiqi MA. Flora of Libya. Vol. 118 (Lamiaceae), Al Faateh University, Faculty of Science Department of Botany, Tripoli-Libya, 1985.
67. Sinha Sankar Narayan, Biswas Karabi. Aconcise review on Nerium oleanderL. An important medicinal plant. Tropical Plant Research. ISSN (P): 2349-9265. 2016; 3(2):408-214.
68. 2016.https://ar.wikipedia.org/wiki/%D8%B5%D9%86%D9%88%D8%A8%D8%B1_%D8%AD%D9%84%D8%A8%D9%8A
69. Wright Michael. The Complete Indoor Gardener. Pan Books Ltd London & Sydney, 1981.