



Original Paper

Floristic Analysis of the Family Asteraceae in Sabratha city- Libya

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ARTICLE INFO

Article history:

Received 22 September. 2018

Revised 18 October. 2018

Accepted 17 December. 2018

ABSTRACT

A survey of the family Asteraceae in Sabratha was taken for two consecutive seasons in the period between 2016-2018. A total number of 43 plant species belong to 33 genera have been collected and identified, the dominant genera were Conyza and Launaea which represented by three species each, followed by the genera Sonchus Chrysanthemum, Crepis, Centaurea and Atractylis which followed by two species each. An ethnobotanical investigation was showed that 7 species regarded to be of medicinal importance, 11 species are fodder plants, and some edible plants were recognized.

Keywords: Asteraceae, Sabratha, Flora, Medicinal plants, Chorotype, Life form.

INTRODUCTION

The family Asteraceae is one of the largest families in the world and has a cosmopolitan distribution which represented by more than 2500 species, and 1100 genera [1]. In Libya, it represented by about 240 species and 97 genera [2], while Pullaiah *et al*, [3]. stated the presence of 237 species and 97 genera.

The Asteraceae family has a wide range of distribution, and easy to spread due to its feathery cypsela fruits in addition to self-fertilization characteristics of this family [4].

Most members of Asteraceae are herbaceous, subshrubs or shrubs, vines, or rarely trees [5, 6,7], shrubs and trees were represented by around 2% [8]. Approximately one of every 10 flowering plant species belongs to the family Asteraceae [9]. Species in this family grow in nearly every type of habitat and has the largest number of described species of any plant family in the world [10].

The family Asteraceae considered to be one of the most economically important families, some species that considered important as food such as lettuce, sunflower for oil and seeds, artichokes, sweetening agents, coffee substitutes and herbal teas, and also those having medicinal importance such as *Artemisia herba- alba*, *Helichrysum stoechas* and *Chamomilla aurea* [11], while some are cultivated as ornamental such as *Dahlia*, *Calendula*, *Centaurea* and *Aster* [4].

Study area:

The boundaries of the study were limited to the Sabratha city which located in the northwest coast of Libya about 60 km west of Tripoli between longitudes 12.8 – 12.31east, and latitudes 32.27 – 32.51 north, the study area is bordered to the north by the Mediterranean Sea, Sorman and Al-Ajelat to the south, Sorman to the east and Zwara city to the west, the total area of the study area is about (610 km²) divided into 11 different localities [12] (Figure. 1).

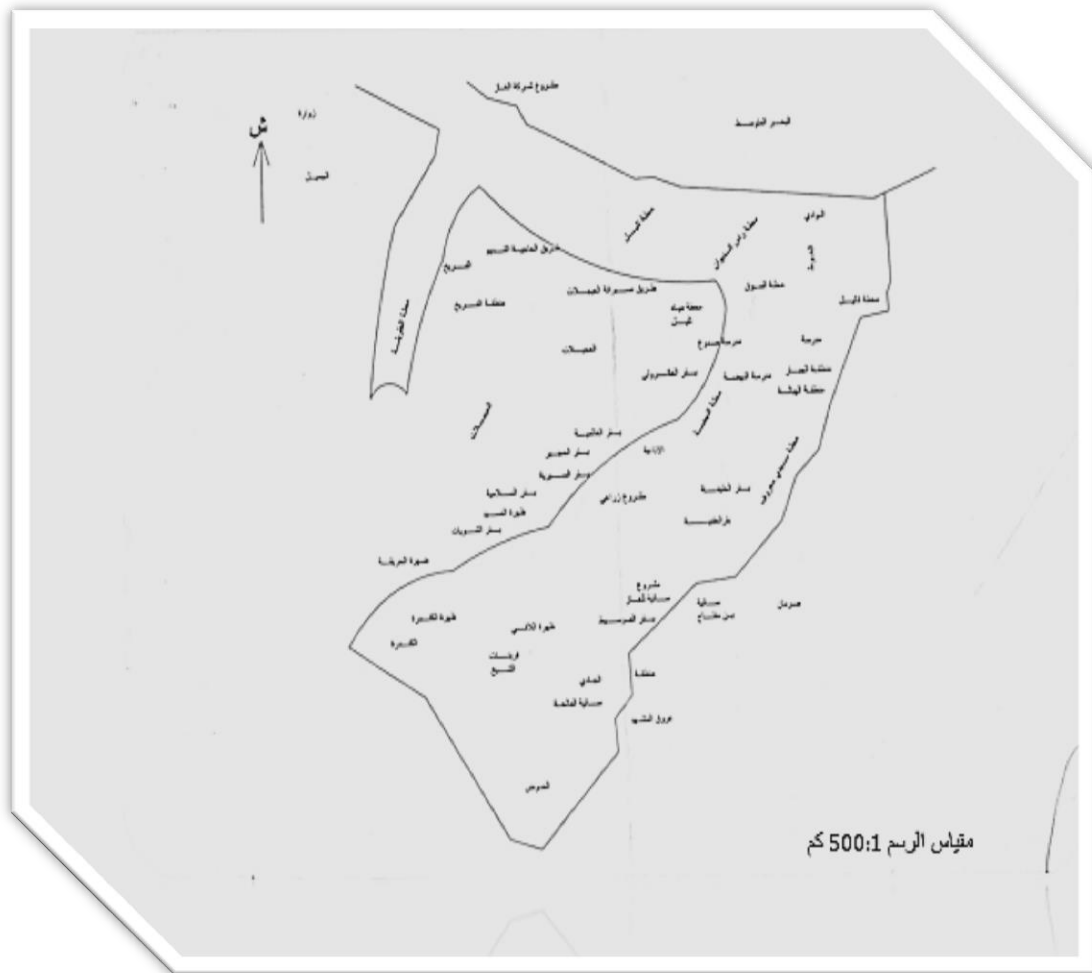


Fig 1. A map of the study area.

Materials and methods

A number of plant collections have been made in between 2016-2018 upon various field trips about one trip per month. The collected plants were then treated by the usual herbarium procedures as mentioned by Porter [11] and [13] including pressing, poisoning, mounting, labeling, and identifying. Identification of plant species was done by using the following literatures [1; 2; 14; 15] with the aid of plant taxonomists in the Botany Department, Faculty of

Sciences, Tripoli University. Eventually, the identified plant specimens were deposited at the herbarium of Botany Department, Faculty of Sciences, Tripoli University.

Results and discussion

At the end of the survey a total of 42 plant species belonging to 35 genera were collected and identified, the results have shown the predominance of the genera *Launaea* and *Conyza* with 3 species each, followed by genera *Sonchus*, *Chrysanthemum*, *Crepis*, *Centaurea*, *Atractylis* with 2 species each, the rest are represented by one species each (Table. 1).

The life form distribution among collected species was characterized by a high proportion of herbs (annuals then perennials). No number of woody (tree and shrub) species in our data, this reflects the hard conditions for capabilities of the species to grow in the area suffer from lack of moisture (such as drought). According Raunkiaer [16] life form categorization, which modified by Govaerts *et al.* [17], the results showed the dominance of Therophytes (with 24 species, 57.14%) of the total species followed by Hemicryptophytes 14 species (33.3%), Chamaephytes (with 3 species, 7.14%) and Geophytes (with 1 species, 2.38%) (Table. 1 & 2) (Figure. 2).

Chorotype analysis of the collected species showed that 12 species (28.57%) are dominated in the Mediterranean region (Fig.4 &5) Followed by Mediterranean /Irano-Turanian regions, and Saharo-Arabian region each represented by 4 species (9.5%), then Euro - Siberian / Mediterranean/Irano-Turanian which represented by 3 species (7.14 species, and both Med/Euro-sib and Cosmopolitan represented by 2 species each (4.76%), the rest of chorotypes are shown in (Table 1 & 3) (Figure 3).

The results also have shown that 9 species were reported to have medicinal importance [18; 19]. and 11 species were reported as fodder plants [20] (Table 1).

Comparing the current study with similar study in the same area by Al-Aifour [21] showed difference in the number of species and genera between both studies. As mentioned above the total number of species collected in this study were 42 species belong to 35 genera while Al-Aifour collected 33 species, among them 24 species were collected in this study, while 18 species collected in the current study but didn't collected in the Al-Aifour study. (Table 4).

Abbreviations

Fodd = Fodder

Medic = Medicinal

Th = Therophytes

Hemi = Hemicryptophytes

Ch = Chamaephytes

Geo = Geophytes

Table 1. Checklist of collected species with economic importance, life forms and Chorotypes.

No	Scientific name	Economic importance	Life form	Chorotype
1	<i>Amberboa tubiflora</i> Murb.		Med/Steppe	Th
2	<i>Anacyclus monanthos</i> L.	Fodd	Med	Th
3	<i>Artemisia campestris</i> L.	Fodd-Medic	Med/Euro-Sib	Ch
4	<i>Atractylis carduus</i> (Forsk.) Christen.		Saharo-Arab	Hemi
5	<i>Atractylis serratuloides</i> Sieb.ex cass.		Saharo-Arab	Hemi
6	<i>Calendula arvensis</i> L.		Med./Irano-Tur/ Saharo-Arab	Th
7	<i>Carduus argentatus</i> L.	Fodd-Medic	E.Med/ W.Iran-Tu	Th
8	<i>Carthamus lanatus</i> L.		Eru-Si./Med./Irano-Tu	Th
9	<i>Centaurea dimorpha</i> Viv		Med/Iran-Tu	Hemi
10	<i>Centaurea glomerata</i> Vahl.		Med	Th
11	<i>Chamomilla aurea</i> (Loefl.) Gay.	Medic	Med/Iran-Tu	Th
12	<i>Chrysanthemum carinatum</i> Schousb	Fodd-Medic	Med/Euro-Sib	Th
13	<i>Chrysanthemum coronarium</i> L.		Med	Th
14	<i>Conyza aegyptiaca</i> (L.) Dryander.		Med	Th
15	<i>Conyza bonarensis</i> (L.) Cornq.	Fodd	Med	Th
16	<i>Conyza canadensis</i> (L.) Cornq.		Cos	Th
17	<i>Crepis libyca</i> (Pamp.) Shabet		Med	Hemi
18	<i>Crepis senecioides</i> Delile		Med	Th
19	<i>Cynara cardunculus</i> L.		Med	Ch
20	<i>Echinops galalensis</i> Sehweinf	Fodd	Med	Hemi
21	<i>Gazania rigens</i> R.B.r		?	Hemi
22	<i>Helianthus annuus</i> L.	Cooking oil	Cos	Th
23	<i>Helichrysum stoechas</i> (L.) Moench.	Fodd-Medic	Med	Hemi
24	<i>Hyoseris scabra</i> L.	Fodd	Med	Th
25	<i>Hypochoeris glabra</i> L.		Med	Th
26	<i>Ifloga spicata</i> (Pcata.)		Med/Saharo-Arabian	Th
27	<i>Jasonia rupestris</i> Bomel.		Med	Hemi
28	<i>Launaea capitata</i> (Sprengel.) Dandy.		Saharo-Sind	Hemi
29	<i>Launaea nudicaulis</i> (L.) Hooker,fil		Saharo-Arab	Hemi
30	<i>Launaea resedifolia</i> (L.). O.Kuntze	Fodd-Medic	S.Med	Hemi
31	<i>Leontodon simplex</i> (Viv) Widder.		Med	Th
32	<i>Onoprdum arenarium</i> (Desf.) Pomel.		Med	Hemi
33	<i>Phagnalon graecum</i> Boiss.&Heldr.		Med	Ch
34	<i>Prolongoa macrocarpa</i> ALavi	Fodd	Saharo-Arab	Th
35	<i>Reichardia tingitana</i> (L.) Roth.		Irano-Tu/Saharo-arab	Th
36	<i>Rhanterium suaveolens</i> Desf.		Steppe / Saharo-Arab	Hemi
37	<i>Scorzonera undulata</i> Vahl.		Med	Geo
38	<i>Senecio gallicus</i> Chiaux.		Med	Th
39	<i>Silybum marianum</i> (L.) Gaertner.		Eru-sib/ Med/ Irano-Tu	Th
40	<i>Sonchus maritimus</i> L.		Med./ W. Iran-Tu	Hemi
41	<i>Sonchus oleraceus</i> L.	Fodd-Medic	Eru-Si./Med./Irano-Tu	Th
42	<i>Tripleurospermum trifurcatum</i> (Desf.) Schultz		Med	Th

Table 2. Life forms of collected species.

Life form	No of species	% of species
Therphytes	24	57.14%
Hemicryptophytes	14	33.3%
Chamaephytes	3	7.14%
Geophytes	1	2.38%

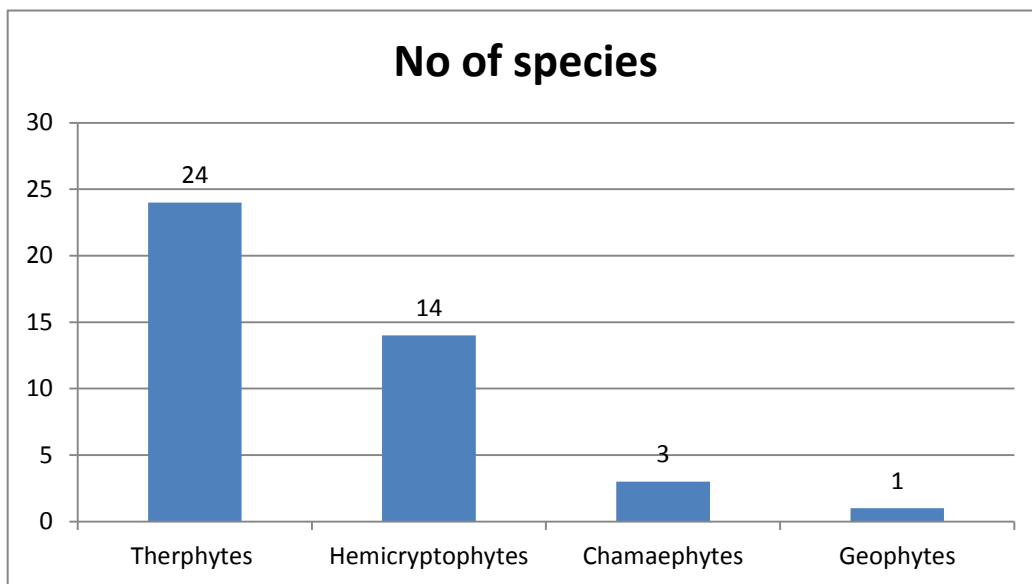


Fig 2. Shows life forms and number of species.

Table 3. Showing chorotypes of collected species.

Chorotype	No of species	% of species
Med	20	47.619
Med./ W. Iran-Tu	4	9.5
Med/Steppe	1	2.38
Med/Euro-Sib	2	4.76
Saharo-Arab	4	9.5
Med./Irano-Tur/Saharo-Arab	1	2.38
Eru-Si./Med./Irano-Tu	3	7.14
Cos	2	4.76
Med/Saharo-Arab	1	2.38
Saharo-Sind	1	2.38
Irano-Tu/Saharo-arab	1	2.38
Steppe / Saharo-Arab	1	2.38

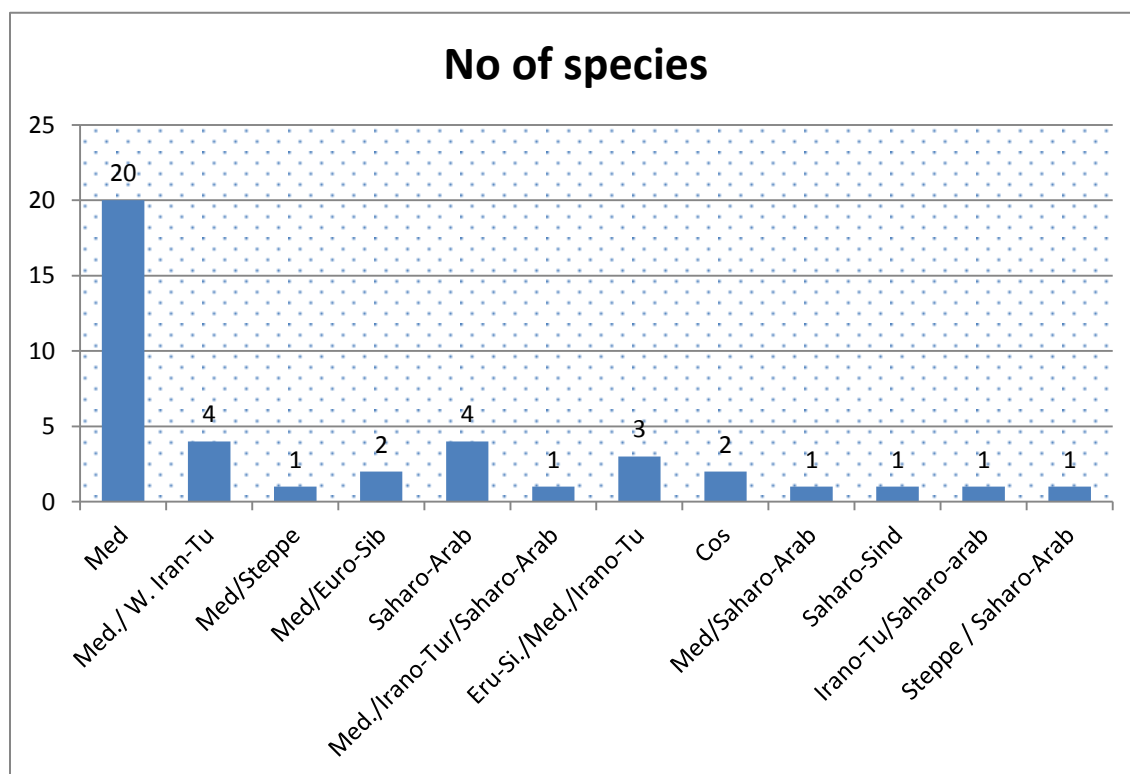


Fig 3. Showing Chorotypes of collected species

Table 4. Current study compared with Al-Aifour study.

No	Scientific name	Current 2018	Al-Aifour 2009
1	<i>Amberboa tubiflora</i>	+	+
2	<i>Anacyclus monanthos</i>	+	+
3	<i>Artemisia campestris</i>	+	+
4	<i>Atractylis carduus</i>	+	-
5	<i>Atractylis serratuloides</i>	+	+
6	<i>Calendula arvensis</i>	+	+
7	<i>Carduus argentatus</i>	+	+
8	<i>Carthamus lanatus</i>	+	-
9	<i>Centaurea dimorpha</i>	+	+
10	<i>Centaurea glomerata</i>	+	+
11	<i>Chamomilla aurea</i>	+	+
12	<i>Chrysanthemum carinatum</i>	+	+
13	<i>Chrysanthemum coronarium</i>	+	-
14	<i>Conyza aegyptiaca</i>	+	+
15	<i>Conyza bonarensis</i>	+	+
16	<i>Conyza canadensis</i>	+	+
17	<i>Crepis libyca</i>	+	-
18	<i>Crepis senecioides</i>	+	-
19	<i>Cynara cardunculus</i>	+	-
20	<i>Echinops galalensis</i>	+	+
21	<i>Gazania rigens</i>	+	-
22	<i>Helianthus annuus</i>	+	-
23	<i>Helichrysum stoechas</i>	+	+
24	<i>Hyoseris scabra</i>	+	-
25	<i>Hypochoeris glabra</i>	+	-
26	<i>Ifloga spicata</i>	+	+
27	<i>Jasonia rupestris</i>	+	-
28	<i>Launaea capitata</i>	+	-
29	<i>Launaea nudicaulis</i>	+	-
30	<i>Launaea resedifolia</i>	+	+
31	<i>Leontodon simplex</i>	+	-
32	<i>Onoprdum arenarium</i>	+	+
33	<i>Phagnalon graecum</i>	+	+
34	<i>Prolongoa macrocarpa</i>	+	-
35	<i>Reichardia tingitana</i>	+	+
36	<i>Rhanterium suaveolens</i>	+	+
37	<i>Scorzonera undulata</i>	+	-
38	<i>Senecio gallicus</i>	+	+
39	<i>Silybum marianum</i>	+	+
40	<i>Sonchus maritimus</i>	+	-
41	<i>Sonchus oleraceus</i>	+	+
42	<i>Tripleurospermum trifurcatum</i>	+	-

References

- 1- Al-Sghair , F.G. & Mahklouf, M. H. (2017). Floristic Analysis of the Family Asteraceae in Libya Depending on Flora of Libya. *American Journal of Life Science Researches*; 5(4): 170-183.
- 2- Alavi , S.A,(1983) .Asteraceae. In Jaferi, S.M.H & EL. Gadi. A.(ed) *Flora of Libya* 107:1- 455.
- 3- Pullaiah, T.; Mahklouf, M; Etayeb, K. (2018) *Global biodiversity (selected contries in Africa)* .Apple Academic Press &Taylor &Francis Group Vol.3(5) pp:113-432.
- 4- Saad, Sh. A. 1994. *Origin, Evolution and Taxonomy of Flowering Plants*. Dar El-Fikr Al-Arabi Publishing.
- 5- Roque N, Bautista H (2008).Asteraceae: caracterização e morfologia floral. Salvador, Brazil: Edufba.
- 6- Funk, V.A. et al. Everywhere but Antarctica: Using a supertree to understand the diversity and distribution of the Compositae. *Biologiske Skrifter* 55: 343-374 (2005).
- 7- Esklual, G. A. Y. (2017) A phylogenetic study of *Crepis L. species sect.Barkhausia* (Asteraceae) using low-copy nuclear genes (gsh1, sqs) and plastid genes (rps16, matK1) Dissertation PHD Institute of Botany, Justus-Liebig-University Giessen.
- 8- Makhlof, M. A., and Layka, S. (2011) Study the Biodiversity of the Asteraceae Family in Lattakia Province, Syria. *Damascus University Journal of Basic Sciences* 27 (2) 299-314.
- 9- Funk, Vicki A.; Fragman-Sapir, Ori (2009). "22. Gymnarrheneae (Gymnarrhenoideae)". In V.A. Funk, A. Susanna, T. Stuessy, R. Bayer. *Systematics, Evolution, and Biogeography of Compositae* (PDF). Vienna: International Association for Plant Taxonomy. pp. 327–332. Retrieved 2016.
- 10- Krupnick, G.A., and W.J.Kress.2005.*Plant conservation: a natural history approach*. University of Chicago Press, Chicago.
- 11- Porter,C.(1967). *Taxonomy of flowering plants*,W.H Freeman and company.
- 12- Sharaf, A. T. 1996. *Geography of Libya*. 2nd edition. Alexandria center for publishing. Egypt.
- 13- Al-Sahhar, Q. F. 1991. *Introduction to the Plant taxonomy*. Al-Dar Al-Arabiya Publishing.
- 14- Al-Hmir, Sh. M and Abuhadra, M. 2008. *Taxonomic study of nortnern Part of Gharyan district*. Botany Department, Faculty of Sciences, Tripoli University. Msc.
- 15- Abuhadra, M. N and Harakat, Z. 2015.*Taxonomic study and vegetation of wadi Ghadu in Jifara plain with notes on environmental impact*. Al-Ostad. Vol 8. P 81 -104.
- 16- Raunkiaer, C. 1934. *The Life Forms of Plants and Statistical Plant Geography*. Clarendon Press, Oxford.
- 17- Govaerts R, Frodin DG & Radcliffe-Smith, A. 2000. *World Checklist and Bibliography of Euphorbiaceae (with Pandanaceae)*. Volume 1. The Royal Botanic Gardens, Kew.
- 18- El-Gadi, A. and Al-Moghrbi, M.1999. *Using some Plants in Libyan folk medicine*.3th Edition,No 1. Dar Al-Kotob. Benghazi, Libya.
- 19- Al-Jnedi, M. J. 1993. *Wild Plants of Jordon, their economic and medicinal importance*. 1st Edition. Al-Aseel Publishing.
- 20- Gintzburher, G. 1976. *Range study of jifara plain, sheep project: Bir-Elchanem (Natural resources unit)*. Tripoli. Libya.
- 21- Al-Aifour, L. A.2007. *Taxonomic study vegetation of Sabrathah city*. Botany Department, Faculty of Sciences, Al-Zawia University.