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Floristic analysis of the family Asteraceae in Al-Jufra region, Libya

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Abstract

The present study focused on the floristic description of Family Asteraceae in the Al-Jufra region of Libya. This description includes a list of plant species of Family Asteraceae and their life-span, life-forms and chorotypes. In 20 stands (25 m² each), a survey of the family Asteraceae species was conducted in Al-Jufra Oases (Waddan, Hun, Zalla, Sawknah and El-Fugha). The results showed that, the family Asteraceae included 23 species, belonged to 19 genera. *Launaea* and *Picris* were the predominant genera with three species each. These species were classified into 14 annuals (60.87 %) and 9 perennials (39.13%). According to life-forms, the recorded Asteraceae members were grouped into 14 therophytes (60.87%), seven chamaephytes (30.43%) and two hemicryptophytes (8.7%). The chorological analysis revealed that, the Saharo-Arabian taxa (8 species, 34.9%) were the most dominant type. Further studies are required to highlight the importance and conservation of family Asteraceae species in the study area.

Keywords: Asteraceae, chorology, oases, Al-Jufra, desert

1. Introduction

The name of family Asteraceae (Compositae) is derived from the type genus *Aster*, while Compositae is an older name but still valid. The latter indicates the characteristic inflorescence type, which is found in only a few other angiosperm families^[1]. Most members of Asteraceae are evergreen shrubs or perennial rhizomatous herbs; biennial and annual herbs^[2]. The Family Asteraceae is rich in economically important and medicinal plant species such as sunflower, lettuce, Chamomile, sweetening mediators, and herbal teas, etc.^[3].

The Family Asteraceae is certainly one of the largest families of flowering plants with a cosmopolitan distribution, particularly in the semiarid region of the tropics and subtropics. Globally, Asteraceae includes ca. 1600 genera and 25000 species^[4], out of these 240 species belonging to 97 genera were distributed in Libya^[5, 6, 7].

In Libya, there are two main phytogeographical regions: the desert, which spreads over most of the country's land (Sahara region), and the narrow coastal strip in the north (Mediterranean region)^[8]. In Libya, about 94:96 % of the land is desert^[5]. The present investigation provides an overview of family Asteraceae species in Al-Jufra desert depression.

2. Materials and methods

2.1 Study area

Al-Jufra region is located at the heart of the Libyan desert (Sahara Desert), and extends between 15.30 to 16.30 east and 29 to 30 north. It covers an area of 1080 km². Al-Jufra's depression is almost elliptical and covers 48 km in length and ca. 22 km in width^[10]. It comprises five main oases namely: Waddan, Hun, Zalla, Sawknah and El-Fugha. The study area is characterized by the presence of salt marshes, reddish-yellow soil, and dry sand soils^[7]. Climatically, the study area lies within the hyperarid zones with an average annual rainfall of 26.4 mm. The temperature is ranged between zero on winter to 45°C on hot summer. This hot and dry climate supports the desert vegetation^[9, 10, 11].

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Fig 1: A map of Libya showing the study area (Al-Jufra). (<https://www.libyaobserver.ly>).

2.2 Floristic sampling

After a series of field trips to the different sites in Al-Jufra region where the Asteraceae species are growing were selected between February 2018 to March 2019. Twenty stands, each of 25 m² were sampled. In each stand, a list of Asteraceae species were collected and identified according to [12, 13]. The description and classification of life-forms of the recorded species were according to Raunkiaer (1934) [14]. Voucher plant specimens were kept at the Herbarium of Biology Department, Faculty of Education, and University of Al-Jufra.

3. Results and discussion

The results of this study revealed that, the total number of family Asteraceae species in the study area was 23 plant species belonging to 19 genera (Table 1). This number is lower than that recorded (43 species) in Sabratha city of Libya [15]. *Launaea* and *Picris* were the predominant genera with three species each (Table. 1). This agreed with [15] who confirmed the dominance of *Launaea* species. The recorded Asteraceae species were classified into 14 annuals (60.87 %) and 9 perennials (39.13%). The perennial plant species were mostly herbaceous, and shrubs without any woody Asteraceae species. The dominance of annuals may.

Table 1: A list of the collected Asteraceae species with their life span, life forms and chorotypes.

Asteraceae species	Life Span	Life form	Chorotype
<i>Anthemis cyrenaica</i> Cosson	Ann	Th	ME
<i>Anvillea garcinii</i> (Burm.fil.) DC.	Per	Ch	SA+IT
<i>Artemisia judaica</i> L.	Per	Ch	SA
<i>Atractylis phazaniae</i> Corti.	Per	Ch	SA
<i>Carduncellus eriocephalus</i> Boiss.	Per	H	SA
<i>Centaurea ammocyanus</i> Boiss.	Ann	Th	SA
<i>Chamomilla pubescens</i> (Desf.) Alavi	Ann	Th	ME
<i>Cotula cinerea</i> Delile.	Ann	Th	SA + SZ
<i>Ifloga spicata</i> (Forssk.) Schultz-Bip.	Ann	Th	ME+IT
<i>Launaea capitata</i> (Spreng.) Dandy	Ann	Th	SS
<i>Launaea nudicaulis</i> (L.) Hook.f.	Ann	Th	ME+SA
<i>Launaea procumbens</i> (Roxb) Ramayya, & Rajagopal	Per	Ch	SA-SI
<i>Nauplius graveolens</i> (Forssk.) Wiklund.	Per	Ch	SA
<i>Perralera garamatum</i> Ascherson	Per	H	ME+SA
<i>Picris altissima</i> Delile.	Ann	Th	ME+SA
<i>Picris asplenioides</i> L.	Ann	Th	SA
<i>Picris pauciflora</i> Delile.	Ann	Th	ME
<i>Pulicaria undulata</i> (L.) C. A. Meyer	Per	Ch	SA+SZ
<i>Reichardia tingitana</i> (L.) Roth.	Ann	Th	ME+IT
<i>Rhanterium suaveolens</i> Desf.	Per	Ch	SA
<i>Senecio glaucus</i> L.	Ann	Th	SA+IT
<i>Sonchus oleraceus</i> L.	Ann	Th	COSM
<i>Voluntaria sinaica</i> (DC.) Wagentiz.	Ann	Th	SA

Ann: annuals; Per: perennials; Th: therophytes; Ch: Chamaephytes; H: hemicryptophytes; ME: Mediterranean; SA: Saharo Arabian; SS: Saharo Arabian -Sindian; IT: Irano-Turanian; SZ: Sudano-Zambezian; COSM: Cosmopolitan;

be attributed to their reproductive capacity, ecological and genetic pliability under high levels of disturbance. In addition, annual species grow in rainy seasons in the oasis, depressions and desert wadis. On the other hand, the perennial species constitute the second component floristic composition [5, 6, 9]. floristic composition (>50%). This agreed with the According to Raunkiaer life forms, the Asteraceae species were

classified into 14 therophytes (60.87%), seven chamaephytes (30.43%) and two hemicryptophytes (8.7%) (Table 1 and Figure 2). The preponderance of therophytes corresponds to the hot dry climate, human and animal interference. Therophytes are adapted to the lack of rainfall in the study area, as they spend their vegetative period in seed form [6]. These results resemble the spectra vegetation of other arid

desert regions of Libya [7, 17, 18, 19, 20, 21, 22, 23].

On the other hand, the global floristic analysis showed that, 8 species (34.9%) were Saharo-Arabian taxa (Table 1 and Figure 3) followed by Mediterranean and Mediterranean/Saharo-Arabian taxa (3 species each), then Saharo-Sindian, Saharo-Arabian/ Irano-Turanian and Mediterranean/Irano-Turanian taxa (2 species each, 8.7%), while Cosmopolitan was represented by one species (4.3%). This finding agreed with the fact that these taxa are good indicators for the arid desert environment [22]. The family Asteraceae species are located within the boundaries of the Saharo-Arabian and Mediterranean regions. Therefore, it seems that the family Asteraceae is cosmopolitan in its distribution.

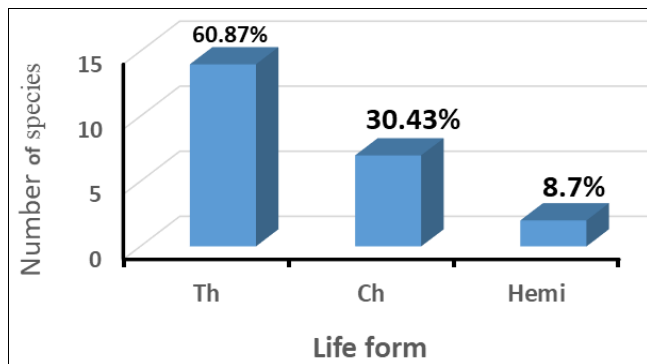


Fig 2: Life form of recorded species of family Asteraceae in the study area. Th: therophytes, Ch: Chamaephytes and Hemi: hemicryptophytes.

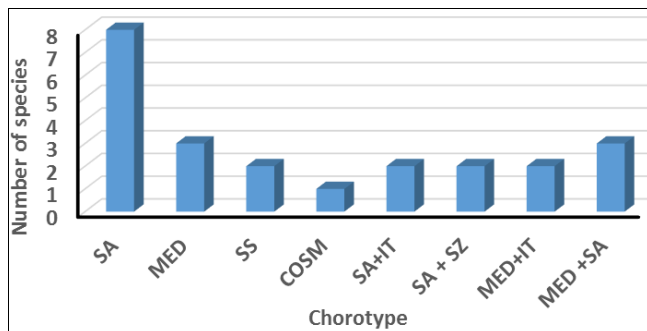


Fig 3: Chorotypes of the collected species of family Asteraceae in the study area. The chorotypes are abbreviated as follow: ME: Mediterranean; SA: Saharo Arabian; SS: Saharo Arabian -Sindian; IT: Irano-Turanian; SZ: Sudano-Zambeian; COSM: Cosmopolitan.

4. Conclusion

The total number of the recorded plant species of family Asteraceae were 23 plant species, belonging to 19 genera. Annuals/therophytes and Saharo-Arabian taxa were dominant among Asteraceae species in the study area.

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