

Floristic Composition, Life Form and Chorology of Plant Life at Al-Saoda, Asir Region, South-Western Saudi Arabia

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Abstract

Asir highlands constitute a major part of south-western Saudi Arabia, and have a temperate climate at elevations above 2500 m a.s.l. This area has a complicated topography. The variations in elevation and topography have resulted in distinctive vegetational zones. Floristic composition, life form and chorology of plant life at Al-Saoda region south – western Saudi Arabia was studied. Three major wadis (sites) were investigated, every site was represented by three localities representing up-stream, mid-stream and down-stream portions of each site. Nine field trips were carried out during 18 months. Vegetation of three localities (Wadi Tahlal, Wadi Al-Moght and Beni Mazen) was studied. Results revealed that the region considers a hot-spot in the Kingdom in term of plant diversity and more diverse compared with other well studied regions in Saudi Arabia. A total of 103 plant species belonging to 40 families were recorded in study area. The major plant families that contributed in the formation of vegetation of the area in question were Asteraceae (22.3%) followed by Papilionaceae (8.7%), Poaceae (6.7%), Lamiaceae (5%), Mimosaceae (4%) while other families each was represented by two or one species. Therophytes exhibited the maximum number of species (35%), followed by chamaephytes (32%), hemicryptophytes (15%) and phanerophytes (9.8%), while the least frequent life form class was geophytes and epiphytes. Chorological characteristic of the recorded flora showed that Saharo-Arabian and Sudanian elements constitute % of the total flora.

Keywords: floristic composition, vegetation, Asir region, chorology, diversity

Introduction

The Kingdom of Saudi Arabia with its 225,000 sq. kilometer area, occupies four fifths of the Arabian Peninsula. As a result of its geologic history, the country shares its flora with Africa in the west, Asia in the northeast, east and southeast and with the Mediterranean region in the northwest and the north. In global geographical term, the vegetation of Saudi Arabia in general has been referred to as belonging to the Arabian sub-zone of the Saharo-Sindian phytogeographical zone (Zohary 1973 and Chaudhary 1999).

Vegetation

The vegetation of Saudi Arabia reflects the geographical position of the Arabian Peninsula between Africa, Asia and Europe. Consequently, the flora has many elements of two of the eight global terrestrial realms; namely the Palaearctic (Europe and Asia) and the Afro-tropical (Africa south of the Sahara) as well as a smaller complement of elements from the Indo-Malayan Terrestrial realm. It is thus an area of ecological and academic significance (Ghazanfar, 2007). A total of 2250 species (including pteridophytes and gymnosperms) in 142 families are recorded in the flora of the Kingdom of Saudi Arabia (Fig.1). According to Collenette (1998), the greatest species diversity in Saudi Arabia occurs in Asir and Hejaz, the western mountainous area of the Kingdom, which borders the Red Sea which can be attributed to a greater rainfall and range of altitude from sea level up to 9,300 ft. Many previous studies showed that topography of the area and the climatic factors are the main factors affecting the degree of speciation (Abulfatih, 1992; El-Kady *et al.*, 1995; Shaltout & Mady 1996; Shaltout *et al.*, 1997).

Study area

Asir region is a mountainous region in southwestern Saudi Arabia located between latitudes 17.25 and 19.50 north and longitudes 50.00 and 41.50 east longitude. It covers approximately 40,000 sq km and consists of mountains, plains, and valleys (wadis). The mountains of southwestern region form a continuous chain of escarpments, extending from Taif to Yemen border. The peaks reach elevations of over 2000 m in the vicinity of Taif and extreme south and over 3000 m in Al-Saoda area. On the western side of the highlands, the mountains fall in a series of dramatic escarpments and finally merge with the Tihama coastal plain while the eastern sides slope more or less gradually towards the interior parts of the country. Asir Mountains are characterized by cool climate, high precipitation and high humidity. The landscape of the region holds a variety of plants, most of which have an affinity with the plants of East African countries. The spectacular beauty and pleasant climate of Asir Mountains attract many people from the central and eastern parts of the country during summer.

Materials and methods

The present work deals with an ecological study on three sites (wadis) at Al-Saoda region namely Wadi Tahlal, Wadi Al- Moght and Beni Mazen; each site was represented by three localities representing up-stream, mid-stream and down-stream portions of each site. Eight field trips were carried out during a period of 18 months (2012-2013)

Data collection

The plant life in 3 wadis represents Al-Saoda region was surveyed from Jun 2012 to Dec 2013. The following characters were studied to determine the floristic composition of plant species in the study regions: 1) list of species 2) degree of abundance-dominance (according to the scale of Braun Blanquet, 1964). Presence of each species in all sites was calculated.

Plant species were classified according to their life form (Rankiaer, 1934). Nomenclature and identification of plants followed Chaudhary, S.A. (ed.) 1983-1999 and Collonette (1999). The Chorotypes of the recorded species was determined from Zohary 1966, 1987; and Boulos 1999, 2000, 2005.

Results and discussion

The floristic composition of Asir Mountain in the Kingdom of Saudi Arabia consists of 103 species belonging to 40 families, 85 dicotyledons (dicots), 18 monocotyledons (monocots). Asteraceae was the dominating family in the study area. According to the Raunkiaerian life form therophytes (35%) followed by chamaephytes (32%), hemicryptophytes (15%) and phanerophytes (9.8%), while the least frequent life form class was geophytes and epiphytes. Chorological characteristic of the recorded flora showed that Saharo-Arabian and Sudanian elements constitute (61%) of the total flora (Appendix 1).

Species diversity

Species belonging to forty families of angiospermae were recorded in the concerned area (Al-Saoda region). These families comprise 103 species. Asteraceae, papilionaceae and poaceae contributed 37.7% of the total recorded species (Appendix 1)

Life form

The life form spectra of the vegetation in Al-Saoda mountains indicated that therophytes (35%) had the highest contribution in the study area of the total recorded species, followed by chamaephytes (32%), hemicryptophytes (15%), phanerophytes (9.8%) and Geophytes (4.8%). While epiphytes were the lowest with a total relative value of 1.9% (Fig. 4).

Chorology

Chorological characteristic of the recorded flora showed that Saharo-Arabian and Sudano-Zambezian elements recorded the highest number (58 species) followed by Mediterranean (26 species), cosmopolitan (9)

Conclusion

A total of 2250 species in 142 families are recorded in the flora of the Kingdom of Saudi Arabia (Fig.1). The greatest species diversity in Saudi Arabia occurs in Asir and Hejaz, the western mountainous area of the Kingdom, which borders the Red Sea which can be attributed to a greater rainfall and range of altitude from sea level up to 2500 m.a.l. Many previous studies showed that topography of the area and the climatic factors are the main factors affecting species diversity. The floristic list of Al-Saoda region in Asir region- Kingdom of Saudi Arabia consists of 103 species belonging to 40 families. Asteraceae was the dominating family in the study area. The life form spectra of the vegetation in the study area indicated the dominance of therophytes (35% of the total recorded species), followed by chamaephytes (32%). Saharo-Arabian and Sudano-Zambezian chorotypes were the most represented species (Abulfatih, 1992; El-Demerdash, et.al. 1994; Shaltout & Mady 1996; Shaltout *et al* 1997; Heneidy, *et al.* 2001; Al-Wadie, H. 2002; Yemeni & Sher, 2010; and AL-Sherif, et.al. 2013).

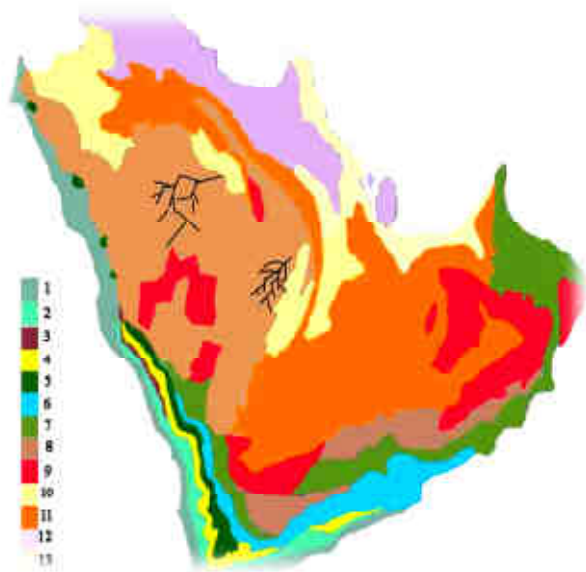


Fig.1

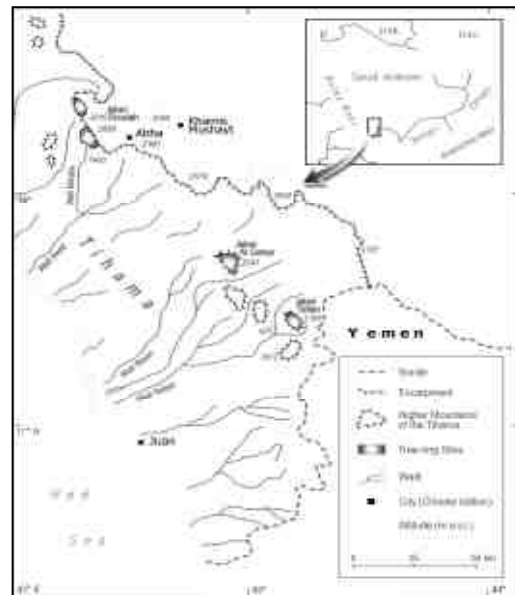


Fig. 2

Figure.1.vegetation of Saudi Arabia (1 and 13). Deserts and sparsely vegetated areas (8, 9 & 11), Dwarf shrublands and related communities (10 & 12, Mountain woodlands and xenomorphic shrublands (2, 3, 4, 5, 6 & 7), Wadi Communities (14)

Figure. 2. Location map of the studied area showing .

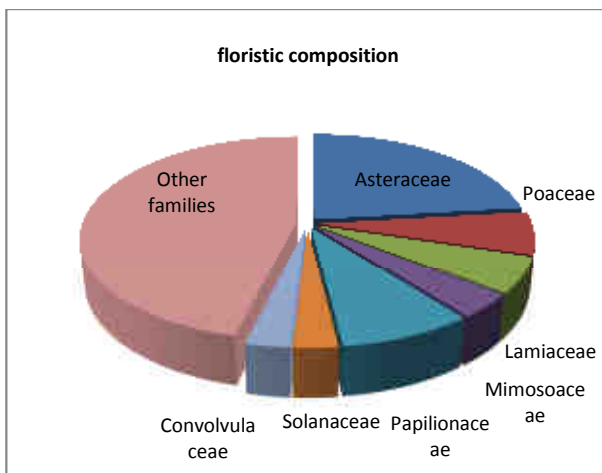


Fig.3.

Figure.3. Plant families dominated the studied area.

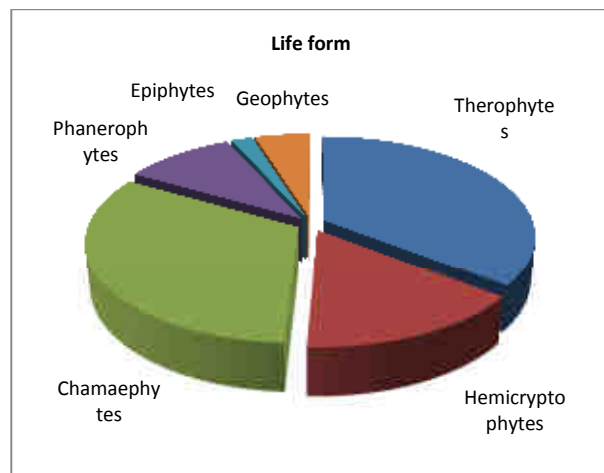


Fig.4.

Figure.4. Proportional percentage of life forms for the study area.

80	<i>Carex distans</i>	Cyperaceae	H	Cosm	-	-	-	-	-	-	-	-	-	-	-	-	-	33.3	11
81	<i>Arnebia decumbens</i> (Vent.) Cross. &k.	Boraginaceae	Th	SA+SU	-	-	-	-	+	-	-	-	33.3	-	-	-	-	-	11
82	<i>Oxalis corniculata</i> L.	Oxalidaceae	Th	ME+IT	-	-	+	33.3	-	-	-	-	-	-	-	-	-	-	11
83	<i>Verbascum bottae</i> Dell.	Scrophulariaceae	Ch	SA	+	-	-	-	+	-	-	33.3	-	-	-	-	-	-	11
84	<i>Monsonia nivea</i> Decne.	Geraniaceae	Th	SU	-	-	-	33.3	-	-	-	-	-	-	-	-	-	-	11
85	<i>Caralluma acutangula</i> (Decne.) N.E.Br.	Asclepiadaceae	Th	SA+SU															
Annuals																			
86	<i>Capsella bursa-pastoris</i> (L.) Medik.	Brassicaceae	Th	Cosm	+++	++	++	100	++	+	+	100	+	+	+	+	100	100	
87	<i>Silybum marianum</i> (L.) Gaertner.	Asteraceae	Th	SA+SU	++	++	+	100	-	+	+	66.6	+	+	+	+	100	88.9	
88	<i>Indigofera spinosa</i> Forssk.	Papilionaceae	Th	ME	+	-	-	66.7	+	+	+	100	-	-	-	-	33.3	66.7	
89	<i>Medicago lupulina</i> L.	Papilionaceae	Th	Cosm	-	-	-	-	+	-	+	66.7	+	+	-	-	66.7	44.4	
90	<i>Ocimum menthaefolium</i> Hochsh.	Lamiaceae	Ch	SA	-	-	-	-	++	+	+	100	+	-	-	-	33.3	44.4	
91	<i>Lepidium africanum</i>	Brassicaceae	Ch	Cosm	-	-	-	-	-	+	+	66.7	+	+	-	-	66.7	44.4	
92	<i>Argemone Mexicana</i> L.	Papaveraceae	Ch	TR	+	-	-	33.3	-	-	-	-	+	+	+	+	100	44.4	
93	<i>Lepidium sativum</i> L.	Brassicaceae	Ch	Cosm	-	-	-	-	++	++	+	100	-	-	+	+	33.3	44.4	
94	<i>Malva verticulata</i> L.	Malvaceae	Th	ME+IT	+	++	-	66.7	-	+	-	33.3	-	-	+	+	33.3	44.4	
95	<i>Bromus tectorum</i> L.	Poaceae	Th	ME+IT	+	-	+	66.7	+	-	-	33.3	-	+	-	-	33.3	44.4	
96	<i>Centaurea sudosinaica</i> Czemp.	Asteraceae	Ch	ME	-	-	-	-	+	+	-	66.7	-	+	-	-	33.3	33.3	
97	<i>Astragalus annularis</i> Forssk.	Papilionaceae	Th	SA	-	-	+	33.3	+	++	-	66.7	-	-	-	-	-	33.3	
98	<i>Crotalaria retusa</i> L.	Papilionaceae	Ch	SU	-	-	-	-	-	-	+	33.3	-	+	+	+	66.7	33.3	
99	<i>Papaver dubium</i> L.	Papaveraceae	Ch	Cosm	+	-	-	33.3	-	-	-	-	-	-	+	+	33.3	22.2	
100	<i>Ipomea eriocarpa</i> R.B.	Convolvulaceae	Th	Cosm	-	-	-	-	+	+	-	66.7	-	-	-	-	-	22.2	
101	<i>Vigna ambacensis</i> Welw.ex Bak.	Papilionaceae	Th	SU	-	-	-	-	-	-	-	-	-	+	+	+	66.7	11	
102	<i>Trifolium arvensis</i> L.	Papilionaceae	Th	ME	-	-	-	-	-	++	-	33.3	-	-	-	-	-	11	
103	<i>Hordeum murinum</i> L.	Poaceae	Th	IT	-	-	-	-	-	-	-	-	-	-	-	+	33.3	11	

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