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Short Communication: Flora, life form and chorological study of *Quercus brantii* habitat in Emamzadeh Abdullah woodland, Iran

SINA ATTAR ROSHAN[1,♥], MEHDI HEYDARI [2]

[1]Department of Environment, College of Agriculture and Natural Resources, Ahvaz Branch, Islamic Azad University, Ahvaz, Khouzestan, Iran. Tel.: +9809167246447, ♥email: sina_2934@yahoo.com

[2]Department of Forestry and Rangeland, Faculty of Agriculture and Natural Resources, Ilam University, Iran.

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ABSTRACT

Roshan SA, Heydari M. 2014. Flora, life form and chorological study of Quercus brantii *habitat in Emamzadeh Abdullah woodland, Iran. Biodiversitas 15: 245-250.* Flora in each region identified an important role in maintaining national reserves of each country to play. Iran is one of the most important centers of plant diversity in to account old world comes closer to 22% of its 8000 plant species are exclusively. Emamzadeh Abdullah forest is located in southeastern Khouzestan province, Iran. The field data were obtained using 70 sample (20m x 20m) plots in a systematic random grid. The attributes include tree and shrub species type, number of each species and canopy coverage, which were recorded by measuring their small and large crown diameters in each sample plot. In order to record the herbaceous species, the Whitaker's snail plot method was applied, which resulted in 64 m² of the minimum plot area. In this study, 154 plant species recognized from the area were identified and collected to 106 genera and 38 belong to the family. Families by Papilionaceae with 20 species, Poaceae with 20 species, Asteraceae with 19 species and Lamiaceae with 12 species and large plant families that total 46.1% of all species are included. Investigation of life forms species shows that Hemicryptophyte are the most important.

Key words: Diversity, flora, Khouzestan, life forms, plant geography.

INTRODUCTION

Iran with about 1.65 million square kilometer surface area is a large country and after Turkey is the richest country of plant diversity in the Middle East (White and Leonard 1991). This country, one of the centers of plant diversity is considered old world so that nearly 22% of the 8000 plant species of flora are endemic (Ghahreman 1994). The life form of any plant is fixed that is developed based on the morphological adaptation of plants to environmental conditions. The life form differences in various societies make up the basis of their structure. Different classification of the life form there, but among them Raunkier system is used most. This system has been built based on vegetative bud's position after spending the season unfavorable for growth and plants are classified in six main groups: Phanerophyte, Chamaephyte, Hemicryptophyte, Cryptophyte, Therophyte and Epiphyte (Asri 1999). Life form also depends on genetics and environmental factors; because the environment can be vital in shaping different forms of plants. According to these, plant communities in different climates can be of different form. Spectrum of dominant life forms in a climate, represent how the plants adaptation on the climate is special. Ecological range of each plant species is unique and a certain amount of changes will endure in environmental conditions. Field distribution of species may be limited or wide (Asri 1998). Vegetation of each region has one of the most important figures and phenomena of nature and the best guiding judgments about the ecological factors in the region. This study is very useful for planning with reference to protection, reclamation and management of valuable species. This study has been done for the first time in this area and its main goals are accurate recognition of plant species, especially local plants and to check and review the chorotype and life form.

MATERIALS AND METHODS

The study area woodland is located in Emamzadeh Abdullah forest, in Baghmalek, Khouzestan province, Southwest Iran, namely in Zagros region; between (31°41′45″) and (31°42′15″) eastern longitude and (50°18′20″) and (50°19′15″) northern latitude (Figure 1).

The considered study site covers an area of 216 hectares. The altitude of the study area is from 1400 to 2136 meters above sea level. According to statistics in Eizeh weather station, average precipitation and the mean annual temperature are 576.4 mm and 19.1°C, respectively. In terms of climate in this area based on coefficient method drought, de Martonne (1926), with semi-arid climate and is based on the method of Emberger (1955) coefficient (60.86) is placed in the range of sub-humid climate areas.

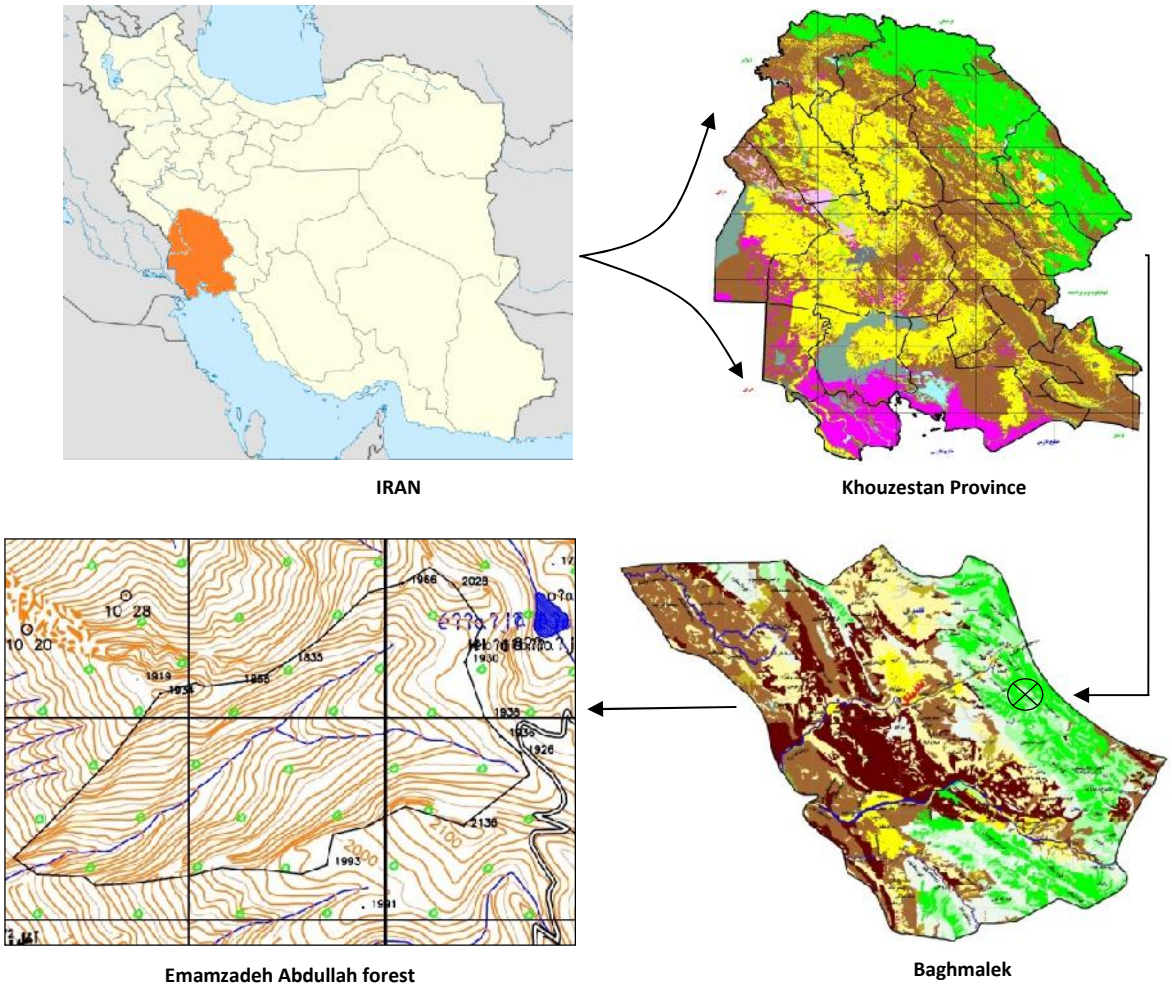

Figure 1. Location of the study site in Baghmalek of Emamzadeh Abdullah woodland, Khouzestan province of Iran.

The field data were obtained using 70 sample plots (20 m x 20 m) in a systematic random grid. The attributes including tree and shrub species, number of each species and canopy coverage, which were recorded by measuring their small and large crown diameters in each sample plot. In order to record the herbaceous species, the Whitaker's nested sampling plot method was used, and minimum area 64 m² was determined. In the intercept, the area and the species number for each plot were drawn toward X an Y axis, respectively then, in the intersection point where the curve became horizontal, a vertical line was drawn toward the X- axis (Muller-Dombois and Ellenberg 1974).

Plant samples were identified in the herbarium of Islamic Azad University in Ahwaz, Iran and by using valid references such as Flora Iranica (Rechinger 1998), Flora of Iraq (Townsend et al. 1960-1985), Flora of Turkey (Davis 1965-1985), Flora of Iran (Assadi et al. 1988-2001), Flora of Khuzestan (Mozaffarian 1999), Flora of Ilam (Mozaffarian 2007), and Flora of Iran (Ghahreman 1975-1999). The life forms of plants were determined by Raunkier method (Raunkiaer 1934). The distribution of plant species was determined using the above flora. Geographical distribution of species was determined based on vegetative areas classified by Zohary (1963, 1973) and Takhtajan (1986).

RESULTS AND DISCUSSION

In this study 154 plant species from the area in 2013 were recognized that was identified under 106 genera and 38 families. List of families and species in the study area, life forms and their distribution are presented in Table 1. The families viz. Papilionaceae (20 species), Poaceae (20), Asteraceae (19), and Lamiaceae (12) were the most important. These families include a total of 46.1% of all the species and each of the families Anacardiaceae, Campanulaceae, Euphorbiaceae, Hypericaceae, Plantaginaceae, Thymelaeaceae, Solanaceae, Papaveraceae, Polygonaceae and Rubiaceae include two species and Amaryllidaceae, Aceraceae, Gentianaceae, Valerianceae, Verbenaceae, Fagaceae, Caprifoliaceae, Lythraceae, Capparidaceae, Rhamnaceae, Urticaceae and Zygophyllaceae include only one plant species respectively. Number of plant species belonging to each family is shown in Figure 2.

Table 1. List of family, species, life form and chorotypes of Emamzadeh Abdullah forest, Iran

Family	Plant taxa	Chorotypes	Life forms
Aceraceae	*Acer monspessulanum* L.	IT	Ph
Amaryllidaceae	*Ixiolirion tataricum* (Pall.) Herb.	IT	Ge
Anacardiaceae	*Pistacia atlantica* Desf.	IT	Ph
Anacardiaceae	*Pistacia khinjuk* Stocks	IT	Ph
Apiaceae	*Bunium persicum* (Boiss.) B. Fedtsch	IT	He
Apiaceae	*Ferula stenocarpa* Boiss. & Hausskn.	S	He
Apiaceae	*Ferula ovina* (Boiss.) Boiss.	IT	He
Apiaceae	*Legousia speculum-veneris* (L.) Chaix	IT, M	Th
Apiaceae	*Pimpinella eriocarpa* Banks & Soland.	IT	Th
Apiaceae	*Pimpinella tragium* Vill.	IT	Th
Apiaceae	*Prangos uloptera* Dc.	IT	He
Apiaceae	*Trugenia latifolia* (L.) Hoffm.	IT, ES	Th
Asteraceae	*Achillea wilhelmsii* C. Koch	IT, S	He
Asteraceae	*Achillea filipendulina* Lam.	IT, S	He
Asteraceae	*Anthemis persica* Boiss.	IT	He
Asteraceae	*Anthemis wettsteiniana* Hand. -Mzt.	IT	Th
Asteraceae	*Artemisia aucheri* Boiss.	IT	Ch
Asteraceae	*Artemisia haussknechtii* Boiss.	IT	Ch
Asteraceae	*Centaurea pabotii* Wagenitz	IT, S	He
Asteraceae	*Centaurea virgata* Lam.	IT	He
Asteraceae	*Carthamus oxyacantha* M. B.	IT	Th
Asteraceae	*Crepis sancta* (L.) Babcock	IT, M, S	Th
Asteraceae	*Cichorium intybus* L.	Cosm	He
Asteraceae	*Cichorium pumilum* Jacq.	IT, M	Th
Asteraceae	*Echinops eriocereus* Bornm.	IT	He
Asteraceae	*Gundelia tournefortii* L.	IT	He
Asteraceae	*Onopordum leptolepis* DC.	IT, S	He
Asteraceae	*Picris strigosa* M. B. subsp. *kurdica* Lack	IT	He
Asteraceae	*Picnomon acarna* (L.) Cass.	IT	He
Asteraceae	*Scariola orientalis* (Boiss.) Sojak	IT	He
Asteraceae	*Sonchus oleraceus* L.	Cosm	Th
Boraginaceae	*Anchusa strigosa* Labill.	IT, M	He
Boraginaceae	*Onosma bulbotrichum* Dc.	IT	He
Boraginaceae	*Onosma dasytrichum* Boiss.	IT	He
Boraginaceae	*Onosma rostellatum* Lehm.	IT	He
Campanulaceae	*Campanula cecilii* Rech. F. & Schiman-Czeika	IT	Th
Campanulaceae	*Campanula perpusilla* Dc.	IT	He
Capparidaceae	*Cleome iberica* Dc.	IT, ES	Th
Caprifoliaceae	*Lonicera nummulariifolia* Jaub. & Spach	IT	Ph
Caryophyllaceae	*Dianthus crossopetalus* (Fenzl ex Boiss.) Grossh.	IT	Ch
Caryophyllaceae	*Dianthus orientalis* Adams. subsp. *orientalis*	IT	Ch
Caryophyllaceae	*Silene conoidea* L.	IT, M	Th
Caryophyllaceae	*Acanthophyllum microcephalum* Boiss.	IT, M	Ch
Convolvulaceae	*Convolvulus arvensis* L.	Cosm	He
Convolvulaceae	*Convolvulus buschiricus* Bornm.	S	He
Convolvulaceae	*Convolvulus stachydifolius* Choisy	IT	He
Cruciferae	*Capsella bursa-pastoris* (L.)	Cosm	Th
Brassicaceae	*Diplotaxis harra* (Forssk.) Boiss.	IT, ES	He
Cruciferae	*Euclidium syriacum* (L.) R. Br.	IT	Th
Cruciferae	*Isatis raphanifolia* Boiss.	IT	Th
Cruciferae	*Neslia apiculata* Fisch. et Mey.	IT	Th
Cruciferae	*Raphanus raphanistrum* L.	IT, ES	Th
Cruciferae	*Sisymbrium officinale* (L.) Scop.	IT	He
Dipsacaceae	*Cephalaria dichaetophora* Boiss.	IT, M	Th
Dipsacaceae	*Pterocephalus brevis* Coult.	IT, M	Th
Dipsacaceae	*Scabiosa calocephala* Boiss.	IT	Th
Euphorbiaceae	*Euphorbia microsciadia* Boiss.	IT	He
Euphorbiaceae	*Euphorbia peplus* L.	IT	He
Fagaceae	*Quercus brantii* Lindl.	IT	Ph
Gentianaceae	*Gentiana olivieri* Griseb.	IT	Ge
Geraniaceae	*Erodium pulverulentum* (Cav.) Willd.	IT, M, S	Th
Geraniaceae	*Geranium dissectum* L.	IT, M, ES	Th
Geraniaceae	*Geranium rotundifolium* L.	IT, M, ES	Th

Hypericaeae	*Hypericum helianthemoides* (Spach) Boiss.	IT	He
Hypericaeae	*Hypericum perforatum* L.	IT	He
Lamiaceae	*Lamium amplexicaule* L.	IT, M, ES	Th
Lamiaceae	*Mentha longifolia* (L.) Hudson var. *petiolata* Boiss.	Cosm	Ge
Lamiaceae	*Nepeta persica* Boiss.	IT	He
Lamiaceae	*Phlomis olivieri* Benth.	IT	He
Lamiaceae	*Phlomis persica* Boiss.	IT	He
Lamiaceae	*Salvia macrosiphon* Boiss.	IT	He
Lamiaceae	*Salvia compressa* Vent.	IT	He
Lamiaceae	*Stachys lavandulifolia* Vahl.	IT, M, ES	He
Lamiaceae	*Teucrium polium* L.	IT, M	Ch
Lamiaceae	*Teucrium oliverianum* Gingins.	IT	He
Lamiaceae	*Thymus kotschyanus* Boiss. & Hohen.	IT	Ch
Lamiaceae	*Ziziphora tenuir* L.	IT	Th
Liliaceae	*Allium atroviolaceum* Boiss.	IT	Ge
Liliaceae	*Allium eriophyllum* Boiss. var. *eriophyllum*	IT	Ge
Liliaceae	*Muscari tenuiflorum* Tausch	IT	Ge
Liliaceae	*Tulipa clusiana* DC.	IT	Ge
Lythraceae	*Lythrum salicaria* L.	IT, ES, S	He
Malvaceae	*Alcea angulata* (Freyn & Sint.) Freyn ex lljin	IT	He
Malvaceae	*Alcea aucheri* (Boiss.) Alef.	IT	He
Malvaceae	*Helianthemum salicifolium* (L.) Mill	IT, M, S	Th
Malvaceae	*Malva parviflora* L.	IT, M	Th
Papaveraceae	*Papaver dubium* L.	IT, M, ES	Th
Papaveraceae	*Papaver macrostomum* Boiss. & Huet ex Boiss.	IT	Th
Papilionaceae	*Astragalus adscendens* Boiss. & Hausskn	IT, S	He
Papilionaceae	*Astragalus cephalanthus* Dc.	IT	Ch
Papilionaceae	*Astragalus fasciculifolius* Boiss.	IT, S	Ph
Papilionaceae	*Astragalus gossypinus* Fisch.	IT	Ch
Papilionaceae	*Astragalus sieberi* Dc.	IT, S	He
Papilionaceae	*Ebenus stellata* Boiss.	IT	Ch
Papilionaceae	*Glycyrrhiza glabra* L. var. *glabra*	IT, M, ES	He
Papilionaceae	*Lathyrus inconspicuus* L.	IT, ES	Th
Papilionaceae	*Medicago coronata* (L.) Bartilini	IT, M	Th
Papilionaceae	*Medicago orbicularis* (L.) Bartilini	Cosm	Th
Papilionaceae	*Medicago polymorpha* L.	IT, M, ES	Th
Papilionaceae	*Medicago radiate* L.	IT	Th
Papilionaceae	*Medicago sativa* L.	Cosm	He
Papilionaceae	*Onobrychis crista-galli* (L.) Lam.	M	Th
Papilionaceae	*Onobrychis cornuta* (L.) Desv. subsp. *cornuta*	IT	Ch
Papilionaceae	*Trifolium campestre* Schreb.	IT, M, ES	Th
Papilionaceae	*Trifolium stellatum* L.	M	Th
Papilionaceae	*Trifolium tomentosum* L.	IT, M, ES	Th
Papilionaceae	*Vicia monantha* Retz.	IT	Th
Papilionaceae	*Vicia villosa* Roth	IT	Th
Plantaginaceae	*Plantago lagopus* L.	IT, M	Th
Plantaginaceae	*Plantago coronopus* L.	IT, M, S	Th
Poaceae	*Avena ludoviciana* Durieu.	IT, M	Th
Poaceae	*Aegilops triuncialis* L.	IT, M	Th
Poaceae	*Agropyron trichophorum* (Link) Richter	IT	He
Poaceae	*Agropyron intermedium* (Host) P- Beauv.	IT	He
Poaceae	*Agropyron tauri* Boiss. & Bal.	IT	He
Poaceae	*Bromus danthoniae* Trin.	Cosm	Th
Poaceae	*Bromus tomenteluss* Boiss.	IT	He
Poaceae	*Bromus tectorum* L.	Cosm	Th
Poaceae	*Bromus sterilis* L.	IT	Th
Poaceae	*Cynodon dactylon* (L.) Pers.	Cosm	He
Poaceae	*Dactylis glomerata* L.	IT, M, ES	He
Poaceae	*Eremopoa persica* (Trin.) Roshev.	IT, M, ES	Th
Poaceae	*Festuca ovina* L.	IT, M	He
Poaceae	*Hordeum bulbosa* L.	IT	Th
Poaceae	*Phalaris minor* Retz.	IT, M	Th
Poaceae	*Poa bulbosa* L.	IT, M, ES	Ge
Poaceae	*Stipa capensis* Thunb.	IT, M, S	Th
Poaceae	*Taeniatherum crinitum* (Schreb.)	IT, M	Th
Poaceae	*Trachynia distachya* (L.) Link.	IT, M, S	Th
Poaceae	*Vulpia myuros* (L.) j. f. Gmel.	IT, M, ES	Th

Polygonaceae	*Rumex crispus* L.	Cosm	He
Polygonaceae	*Rumex vesicarius* L.	S, M	Th
Ranunculaceae	*Delphinium cyphoplectrum* Boiss.	IT	Ge
Ranunculaceae	*Ranunculus arvensis* L.	IT	Th
Ranunculaceae	*Ranunculus asiaticus* L.	IT, M	Ge
Rhamnaceae	*Rhamnus persica* Boiss. & Hohen.	IT	Ph
Rosaceae	*Amygdalus orientalis* Duh.	IT	Ph
Rosaceae	*Amygdalus scoparia* Spach	IT	Ph
Rosaceae	*Crataegus azarolus* L.	IT	Ph
Rosaceae	*Rosa elymatica* Boiss. & Hausskn.	IT	Ph
Rubiaceae	*Galium setaceum* L.	IT	Th
Rubiaceae	*Galium tricorne* Stokes	IT, ES	He
Scrophulariaceae	*Verbascum sinuatum* L. var. *sinuatum*	IT, ES, S	He
Scrophulariaceae	*Verbascum assurense* Bornm. & Hand. -Mzt.	IT	He
Scrophulariaceae	*Verbascum kochiforme* Boiss. & Hausskn.	IT	He
Scrophulariaceae	*Veronica anagallis-aquatica* L.	Cosm	Th
Solanaceae	*Hyoscyamus orthocarpus* Schonbeck-Temesy	IT	He
Solanaceae	*Hyoscyamus tenuicaulis* Schonbeck-Temesy	IT	He
Thymelaeaceae	*Daphne mucronata* Royle	IT, ES	Ph
Thymelaeaceae	*Daphne stapfii* Bornm. & Keissler	IT	Ph
Urticaceae	*Parietaria judaica* L.	IT	He
Valerianceae	*Valerianella vesicaria* (L.) Moench.	IT, M	Th
Verbenaceae	*Vitex pseudo-negundo* (Hausskn.) Hand-Mzt.	IT	Ph
Zygophyllaceae	*Peganum harmala* L.	Cosm	He

Note: Ph: Phanerophyte, He: Hemicryptophyte, Th: Therophyte, Ge: Geophyte, Ch: Chamaephyte. IT: Irano-Turanian, M: Mediterranean, S: Sahara-Sindian, ES: Euro-Siberian, Cosm: Cosmopolite

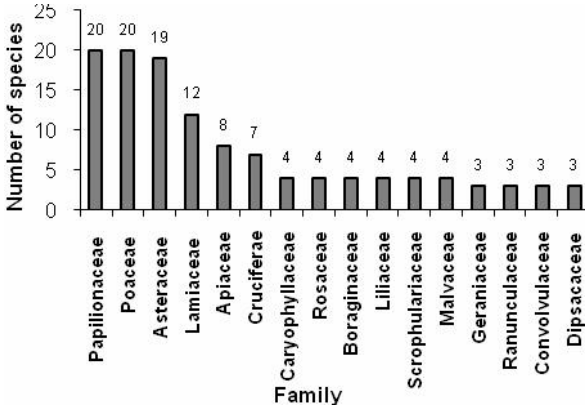

Figure 2. Number of plant species in each family in Emamzadeh Abdullah forest.

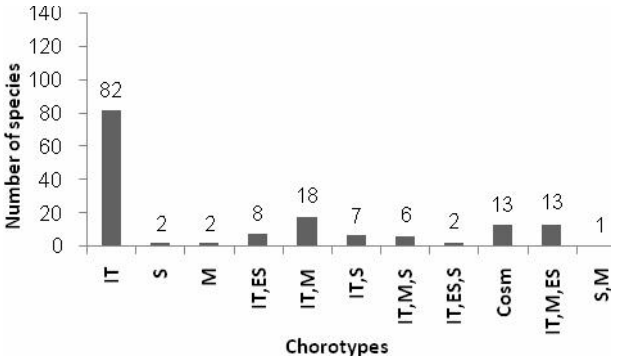

Figure 4. Chorological types spectrum in flora in Emamzadeh Abdullah forest.

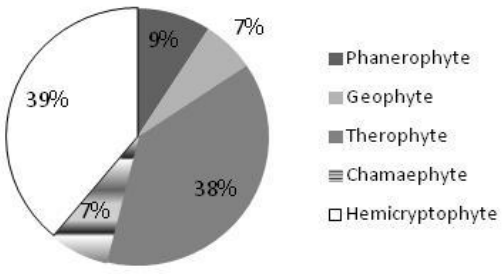

Figure 3: Life form spectrum of Emamzadeh Abdullah forest.

Life forms study by Raunkiaer method (Raunkiaer 1934), showed that the most important group is hemicryptophyte. In this study, Hemicryptophyte include 40% of total species, Therophyte 38%, Phanerophyte 9% and Geophytes 6% respectively. Spectrum of life forms for plant species was shown in Figure 3.

Geographical distribution study showed that the most important chorotype is Irano-Turanian. In this study, Irano-Turanian group is includes 53.3% and Mediterranean 11.7% respectively of the geographical distribution. These chorotypes include 65% of all total species. Spectrum of geographical distribution was shown in Figure 4.

It is concluded from the results of the study that the study area is very rich with reference to plant diversity. Among all plants Hemicryptophyte is dominant and Therophyte with is in the next order. In fact life forms of the plants indicate the possibility of adaptation of plants to environmental factors especially climatic condition.

According to Mobayen (1975, 1985, 1995) the frequency of Therophyte plants is due to Mediterranean climate and the frequency of Hemicryptophyte is due to cold and temperate climate. As a whole, the frequency of the Hemicryptophyte and Therophyte shows the effect from two types of climate, Mediterranean and cold

temperate. Therophyte adapted to the dryness of the region and shortage rainfall, spend vegetative period in the form of seed (Asri 2003; Asaadi 2009; Nadaf et al. 2011; Ejtehadi et al. 2003). Hemicryptophytes have adapted to condition of area by using different ways such as: reserving water, using ground water, reducing water need by losing leaves and reduction of vegetative growth. Dominance of hemicryptophyte and therophyte clearly indicate the adaptation of these plants to aridity of area. The geographical distribution of plants reflects the climate conditions. Considering to this fact that 53.3% plant species in this area are Irano-Turanian elements, we can conclude that this area belongs to Irano-Turanian (the Irano-Turanian is characterized by low rainfall and a long dry season) (Ghahreman et al. 2006a,b; Khodadadi et al. 2009; Mataji et al. 2013; Heydari et al. 2013). The *Astragalus* diversity with its montane 5 species show that *Astragalus* has adapted to the montane conditions. The existence of Asteraceae and Lamiaceae families with large diversity is the result of destruction in this area.

It is understood that the increase in number of member of some plant families including Asteraceae is accompanied with destruction in area, study from Archibold (1995) and Vakili-Shahrebabaki et al. (2001) lend support to the fact. Significantly the presence of the species viz. *Stachys lavandulifolia*, *Teucrium polium*, *Teucrium oliverianum*, *Phlomis olivieri* and *Euphorbia* sp. is the indication of destruction in no protected portions of this area.

The study area is very rich with reference to plant diversity. Documenting floristic composition of a habitat is valuable for continuing ecological research, management and conservation of plants and animals. Resources available for conservation of species and ecosystems are in short supply relative to the needs. Targeting conservation and management actions toward the species and ecosystems requires clearly established priorities such as study of floristic composition as a principle tool. So, in this research, identification of 154 plant species in Emamzadeh Abdullah forest along with their chorology, plant family and life form are of central importance for further ecological investigation, conservation and management of wildlife refuge of Iran.

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