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Biodiversity in oak forests (*Quercus castaneifolia* and *Quercus macranthera*) in Ramsar, Northern Iran

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Abstract

The study was accomplished in pure and mixed stands of *Quercus castaneifolia* and *Quercus macranthera* in northern Iran. collection of the sample and study of the ecological factors including the seasons, spring, summer and autumn of the years 2009 and 2010 was conducted and the scientific name of the species, life forms and Chorology were recorded using the available resources. 186 species have been identified of 6 Pteridophytes families, 2 families from Gymnosperms and 52 families of Angiosperms (8 families from a Dicotyledone and 44 families of Monocotyledon). The maximum number of species was related to the flowing family: Asteraceae, Papilionaceae, Lamiaceae, Orchidaceae and Poaceae. Raunkiaer's classification of Hemicryptophytes 49%, Cryptophytes 20%, Phanerophytes 19%, and 8% Therophytes, Chamaephytes 3 percent and 1 percent of Epiphytic species are allocated to the region. Chorology study area showed the highest value in zone of Europe-Siberia (the Caspian), with 41% belonging. The study of the list of endangered species showed one endangered species, 5 vulnerable species. 20 species were identified as lower risk. *Lilium ledebourii* was identified as a rare species with relatively wide distribution in different parts of the region.

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Introduction

Northern forests of Iran , with 800 km length , 110 km width and a total area of 84/1 million hectares is located in of Gilan, Mazandaran and Golestan the provinces (Naqinezhad *et al.,* 2010). Northern forests (Hyrcanian forests) known as one of the important floristic regions of Iran (Atashgahi *et al.*, 2009; and Ejtehadi *et al.*, 2004). Forest ecosystems are the most important functional component of the North Iran landscape, and they are essential for maintaining biological diversity. Study area, including special districts, with virgin pure and mixed stands of oaks (*Quercus castaneifolia* and *Quercus macranthera*). Management of natural resources requires a comprehensive and complete information on all the features of each region especially vegetation. Understanding the factors determining the distribution of understory plants is important for biological conservation because the herb-layer vegetation represents the largest component of biodiversity in most forest ecosystems (Yu M, Sun OJ, 2013). Vegetation is classified as the most prominent defining characteristic of ecosystems, because the presence of any natural plant stands over time in one location can present, the specific circumstances and the stable condition is, (Braun-Blanquet, 1928). Identifying the elements of the vegetation can be considered as an infrastructural for other research areas. Some Floristic studies on Hyrcanian forest vegetation has been done (Djazirei, 1965; Mobayen and Tregubov, 1970; Zohary, 1973; Dorostkar, 1976; Assadollahi, 1980; Hamzeh'ee, 1994; Frey and Probst, 1986; Ghahreman *et al.*, 2006; Hamzeh'ee *et al.*, 2008; Akbarinia *et al.*, 2004; Mahmoudi, 2007; Razavi *et al.*, 2004 & 2009; Razavi, 2008; Nazerian *et al.*, 2004; Sharifi *et al.*, 2007; Jafari and Akhany, 2008; Naqinezhad *et al.*, 2008, 2009 & 2013; Noroozi *et al.*, 2008; Akbarzadeh, 2007; Ravanbakhsh and Amini, 2012; Razavi *et al.*, 2009; Atashgahi *et al.*, 2009; GharemaniNezhad *et al.*, 2009). Only a few studies relating vegetation to environmental variables have been carried out in the Hyrcanian area forests (Assadollahi, 1980; Djazirei, 1965; Esmailzadeh *et al.*, 2011; Naqinezhad *et al.*, 2008; Rastin, 1983; Sefidi *et al.*, 2011). Elsewhere, some attempts have been undertaken to identify ecological indicator species in non-forest Iranian ecosystems (Jafari *et al.*, 2004, 2010; ZarifKetabi *et al.*, 2010) and to a lesser extent in forests (EshaghiRad and Shafiei, 2010; EshaghiRad *et al.*, 2009; Mataji *et al.*, 2009, & 2010; Shakeri *et al.*, 2012;

Naqinezhad *et al.*, 2013). The studies conducted generally in beech forest stands (Mataji *et al.*, 2009, 2010; EshaghiRad *et al.*, 2009, 2010). And alder stands (Naqinezhad *et al.*, 2008), generally in the North Slope (Naqinezhad *et al.*, 2010) and plain areas (Naqinezhad *et al.*, 2012). So far detailed study focused on determining the floristic composition of oak stands (*Quercus castaneifolia* and *Quercus macranthera*) on the southern slope not been reported. According to the importance of this area, it is needed to identify and evaluate the natural habitat of oak. The purpose of this study was to identified and introduced Oak forest floor flora and provide information on geographical distribution and life forms of the plants. The importance of the studies as a basis necessary for various studies like, rangeland, forestry, watershed management, and agriculture is undeniable. Identification of the forest plant species, is very valuable for identification of the ecological groups the study cavities, disturbances, reproductive, evolutionary process, invasive species monitoring, and the species in the transition zone. This study is merely aimed to identify the vegetation of *Quercus castaneifolia* and *Quercus macranthera* forests for the first time in the north of Iran.

Materials and methods

Study areas

The studied location was pure and mixed stands of oak forests, *Quercus castaneifolia* and *Quercus macranthera* in Northern Iran (950 hectares). The latitude and longitude of the mentioned location was 36°, 48', 30″ and 36°, 49', 36″ N, 50°, 34', 30″ and 50°, 37', 30″ E, respectively (Fig. 1). Height of rom see level was 1200 to 2200 and average slope was average slope of 70% (minimum of 27 and maximum of 100%). Also it allocated in south and southwest geographical directions with mountain temperate

climate, mean annual precipitation of 1148/5 mm. Series of geological formations in the Permian, Triassic, and Jurassic of the geology first and second period is observed.

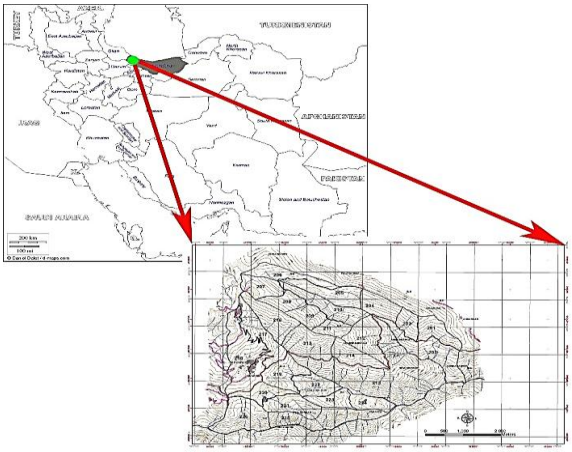

Fig. 1. Map of studied area.

The soil type is brown forest acidic soil with sandy-loam or loamy texture, mid-depth and deep soil, cubic or prismatic structure, Mull humus to Mudra, and root penetration depth was 35 to 60 cm. The soil of the mentioned region had good fertility even in the slow depths exposed to erosion.

Data collection

Plants collected during spring, summer and autumn of the 2009 and 2010. Braun-Blanquet method was used in of chestnut-leaved Oak and Persian oak stands and the names of the plants along the roads and other forest types in the area, skipped. Collect data in a systematic transect spacing of 100 x 150 m was in the range of oak stands. Other forest types not performed collected. Ultimately data were collected from 130 plots of 25 x 25 m^2. Herbarium plant species transferred to the College of Agriculture and Natural Resources, Islamic Azad University of Karaj and were identified by Flora Iranica (Rechinger, 1963-1998), Flora Turkey (Davis, 1965-1985), Flora Iran (Asadi *et al.*, 1988-2007), Colored flora of Iran (Ghahraman, 1975-2000) and Flora Europe. The life form of plant species was determined by using of Raunkiaer method. Publication of the Flora Iranica (Rechinger, 1963-1998), Flora Turkey (Davis, 1965-1985), Flora Iran (Asadi *et al.*, 1988-2007) Flora Iraq (Townsend, 1966-1985) and Flora Europe were determined using the resources of indigenous species (endemic), and risk was found.

Results

186 species from 59 families and 148 genus were identified in oak stands. Pteridophyte the 10 species of 6 families, 3 species from 2 families of gymnosperms and 174 species from 51 families of angiosperms, monocots class with 27 species from 7 families and dicotyledonous class with 146 species from 44 families has a ranks highest in terms of species. Asteraceae with 22 species and 17 genera, Rosaceae with 16 species and 14 genera, Papilionaceae with 13 species and 7 genera, Lamiaceae with 11 species and 10 genera, Orchidaceae with 10 species and 8 genera, Poaceae with 8 species, 6 genera were the largest families of region that comprises 43% of all species (Fig. 4). The genus of a species in 118 genera, 20 genera, two species, three species of 8 genera, is a genus of four species. Percent of the region's plant life forms according to the method Raunkiaer's that Hemicryptophytes have the highest frequency, with 92 species. Then Cryptophytes with 38 species, Phanerophytes with 35 species (7 species separately Megaphanerophytes, Mesophanerophytes of 10 species, with 9 species, Nanophanerophytes with 9 species, and Microphanerophytes with 9 species), Therophytes with 15 species, Chamaephytes with 5 species and Epiphytic with one species have the highest frequency (Fig. 2). Investigation on geographical distribution of plants species showed that the highest frequency related to the Europe-Siberia (the Caspian) region with 73 species, Europe-Siberia and Iran-Turanian with 44 species, Europe-Siberia, Iran-Turanian and Mediterranean region with the 14 species, and 11 multi-regional species plus 10 endemic species (Fig. 3). Listed species were classified as follow: one species as endangered (EN), 5 species as vulnerable (VU), and 20 species as lower Risk (LR) in the studied oak forest (Table 1).

Table 1. Plant species with the families of the four sections Pteridophyte, Gymnosperms, Dicotyledonous, Monocotyledonous and each section in alphabetical order, along with and the Life form, conservation status of species and Chorology species.

Family	Scientific name	Life form	Chorology	Risk species	*Quercus castaneifolia*	*Quercus macranthera*	*Quercus* Mixed
Pteridophytes							
Aspleniaceae	*Asplenium adiantum-nigrum* L.	Cr.	PI		*	*	*
	Asplenium ruta-muraria L.	Cr.	PI	VU			*
	Asplenium trichomanes L.	H.	CO		*		*
	Phyllitis scolopendrium (L.) Newm.	Cr.	PI				*
Dryopteridaceae	*Dryopteris filix-mas (L.) Schott*	Cr.	PI				*
	Polystichum aculeatum (L.) Roth	Cr.	PI				*
Hypolepidaceae	*Pteridium aquilinum* (L.)Kuhn.	Cr.	PI		*	*	*
Ophioglossaceae	*Botrrychium lunaria* (L.)Swartz	Cr.	PI	VU	*		
Polypodiaceae	*Polypodium vulgare* L.	Cr.	PI				*
Pteridaceae	*Pteris cretica* L.	Cr.	ES				*
							Gymnosperms
Cupressaceae	*Juniperus communis* L.	Nan.	CO		*	*	*
	Juniperus sabina L.	Nan.	ES,IT			*	
Taxaceae	*Taxus baccata* L.	Mes.	ES	EN			*
							Spermatophytes/Angiosperms/Dicotyledones
Aceraceae	*Acer campestre* L.	Mes.	ES			*	
	Acer cappadocicum Gled.	Meg.	ES		*	*	*
	Acer hyrcanum Fisch. & C.A.Mey.	Mes.	ES			*	
	Acer velotinum Boiss.	Meg.	ES				*
Apiaceae	*Bupleurum marschallianum* C.A.Mey.	Cr.	IT,M		*	*	*
	Chearophyllum aureum L.	H.	ES,IT		*	*	*
	Heracleum persicum Desf. Ex Fischer	H.	IT		*		*
	Laser trilobum (L.) Borkh.	H.	ES,M		*	*	*
	Libanotis transcaucasica Schischk.	H.	ES,IT		*		*
	Pimpinella affinis Ledeb.	H.	IT		*	*	*
	Sanicula europaea L.	H.	ES,M		*	*	*
Aquifoliaceae	*Ilex aquifolium* L.	Mic.	End		*		
Asclepiadaceae	*Vincetoxicum scandens* Sommier & Levier	H.	ES,IT		*	*	*
Family	Scientific name	Life form	Chorology	Risk species	*Quercus castaneifolia*	*Quercus macranthera*	*Quercus* Mixed
Asteraceae	*Anthemis talyschensis* A.Fedor	H.	ES,IT		*	*	*
	Carlina vulgaris L.	Th.	ES,IT		*	*	*
	Carpesium cernuum L.	Th.	ES		*		*
	Centaurea hyrcanica Bornm.	H.	ES,IT		*	*	*
	Centaurea zuvandica (Sosn.) Sosn,	H.	IT		*	*	*
	Cirsium oseticum (Adams) Petrak	H.	ES,IT		*		*
	Dichrocephala integrifolia (L.fil.) O.Kuntze	H.	ES				*
	Echinops Koeltzii Rech.f.	H.	End		*	*	*
	Eupatorium cannabinum L.	H.	ES				*
	Hieracium pilosella L.	H.	ES,IT				*
	Inula montbertiana DC.	H.	ES,IT	LR	*		*
	Inula salicina L.	H.	ES,M		*		*

Family	Scientific name	Life form	Chorology	Risk species	*Quercus castaneifolia*	*Quercus macranthera*	Mixed
	Inula vulgaris (Lam.) Treisan	H.	ES		*		*
	Lapsana communis L.	H.	ES,IT		*	*	*
	Leontodon asperrimus (Willd.) Boiss.	H.	IT			*	
	Leontodon hispidus L.	H.	ES,IT,M	LR	*	*	*
	Petasites hybridus (L.) P.Gaertn.	Cr.	ES,IT				*
	Serratula quinquefolia M. B. ex Willd.	H.	ES		*	*	*
	Solidago virga-aurea L.	H.	ES		*	*	*
	Tanacetum coccineum (Willd.) Grierson	H.	ES			*	
	Tanacetum parthenium (L.) Schultz-Bip.	H.	CO		*		
	Taraxacum sp.	H.	IT		*	*	*
Asteraceae							
Berberidaceae	*Berberis integerrima* Beg.	Mic.	ES,IT,M			*	
Betulaceae	*Alnus subcordata* C. A. Mey.	Meg.	ES				*
	Alliaria petiolata (M.B.)Cavara & Grande	H.	IT,M		*		*
Brassicaceae	*Arabis sagittata* (Bertol.) DC.	H.	ES		*		*
	Cardamine bulbifera (L.)Crantz	H.	ES			*	*
	Cardamine quinquefolia (M. B.) Schmalh.	H.	ES				*
	Hesperis hyrcana Bornm. & Gauba	H.	ES		*		*
	Thlaspi hastulatum (Stev. Ex.) DC.	Th.	IT		*	*	*
Campanulaceae	*Campanula involucrata* Auch. ex DC.	H.	ES,IT		*	*	*
	Campanula odontosepala Boiss.	H.	ES		*	*	*
Caprifoliaceae	*Lonicera caucasica* Pall.	Nan.	ES			*	*
Caryophyllaceae	*Silene bupleuroides* L.	Th.	ES,IT		*	*	
	Silene persicum Boiss.	Th.	End	LR	*		
	Silene schafta Gmel.	H.	ES				*
	Stellaria holostea L.	H.	ES,IT		*	*	*
	Stellaria media (L.)Cyr.	Th.	CO		*		
	Viburnum lantana L.	Mic.	ES,IT		*		*
Cistaceae	*Helianthemum nummularium* (L.) Miller	H.	ES,IT			*	
Convolvulaceae	*Calystegia sepium* (L.) R.Br.	H.	CO		*		*
Cornaceae	*Cornus australis* C.A.Mey.	Mic.	ES,IT,M			*	*
Coryllaceae	*Carpinus betulus* L.	Mes.	ES		*	*	*
	Carpinus orientalis Miller	Mes.	ES,IT		*		*
Crassulaceae	*Sedum stoloniferum* S.G.Gmel.	H.	ES				*
Dipsacaceae	*Dipsacus strigosus* Willd. Ex Roemer	H.	ES		*		*
	Scabiosa columbaria L.	H.	IT		*	*	*
Euphorbiaceae	*Andrachne colchica* Fisch. & Mey.	Ch.	ES,M				*
	Euphorbia sp.	Th.				*	
	Euphorbia amygdaloides L.	Ch.	ES,M		*	*	*
	Euphorbia squamosa Willd.	Th.	ES			*	*
	Mercurialis perennis L.	H.	ES			*	*
Fagaceae	*Fagus orientalis* Lipsky	Meg.	ES		*		*
	Quercus castaneifolia C.A.Mey.	Meg.	ES		*	*	*
	Quercus macranthera Fisch. et Mey.	Mes.	ES		*	*	*
Gentianaceae	*Centaurium minus* Moench	Th.	ES,IT		*		*
Geraniaceae	*Geranium montanum* Habl ex Pall.	H.	ES	VU	*		*
	Geranium purpureum Vill.	Th.	ES		*		
Hammamelidaceae	*Parrotia persica* (D.C.) C.A.Mey.	Mes.	ES	LR			*

Family	Scientific name	Life form	Chorology	Risk species	*Quercus castaneifolia*	*Quercus macranthera*	Mixed
Hypericaceae	*Hypericum androsaemum* L.	Ch.	ES,M		*	*	*
	Hypericum perforatum L.	Th.	PI		*	*	*
Lamiaceae	*Calamintha officinalis* Moench	H.	ES,IT		*	*	*
	Clinopodium vulgar L.	H.	ES,IT,M		*	*	*
	Lamium album L.	H.	ES,IT		*	*	*
	Mentha pulegium L.	H.	ES		*		
Lamiaceae	*Origanum vulgare* L. subsp. Viride (Boiss.) Hayek	H.	ES,IT		*	*	*
	Prunella vulgaris L.	H.	CO		*	*	*
	Salvia glutinosa L.	H.	ES,IT		*	*	*
	Scutellaria tournefortii Benth.	H.	ES,IT		*	*	*
	Stachys byzanthina C.Koch.	H.	ES,IT		*		*
	Stachys persica Gmel.	H.	ES		*	*	*
	Teucrium chamaedrys L.	H.	ES,IT,M		*	*	*
Linaceae	*Linum nervosum* Waldst. & Kit.	Th.	ES,IT		*	*	*
Loranthaceae	*Viscum album* L.	EP.	PI			*	*
Oleaceae	*Fraxinus excelsior* L.	Meg.	ES,M	LR			*
Onagraceae	*Circaea lutetiana* L	Cr.	PI				*
paeoniaceae	*Paeonia wittmanniana* Hartw.	H.	ES	LR		*	*
Papilionaceae	*Astragalus glycyphyllus* L.	H.	ES,IT	LR	*	*	*
	Coronilla orientalis Mill.	H.	ES,IT	LR		*	*
	Coronilla varia L.	H.	ES		*	*	*
	Lathyrus laxiflorus (Desf.) Kuntze.	Cr.	ES,IT,M		*	*	*
	Lathyrus roseus Stev.	Th.	ES,IT	LR	*	*	*
	Lathyrus vernus (L.)Bernh.	H.	ES	LR	*	*	*
	Medicago lupulina L.	Th.	IT		*	*	*
	Onobrychis mazanderanica Rech.f.	H.	End.	LR			*
	Trifolium canescens Willd.	H.	ES,IT		*	*	*
	Trifolium tumens Stev. ex M.B.	Cr.	IT,M		*	*	*
	Vicia crocea (Desf.) B. Fedtsch.	Ch.	IT		*	*	*
	Vicia truncatula Fischer ex M. B.	H.	ES		*	*	*
	Vicia subvillosa (Ledeb.) Trautv.	Th.	ES		*	*	*
Plantaginaceae	*Plantago atrata* Hoppe	H.	ES,IT		*	*	*
Podophylaceae	*Epimedium pinnatum* Fisch.	Cr.	ES		*	*	*
Polygalaceae	*Polygala anatolica* Boiss. & Heldr.	H.	ES,IT,M		*	*	*
Primulaceae	*Cyclamen coum* Miller.	Cr.	ES,IT,M				*
	Primula heterochroma Stapf.	H.	End.		*	*	*
Ranunculaceae	*Ranunculus sp.*	H.			*	*	*
Rhamnaceae	*Frangula alnus* Miller	Mic.	ES	VU			*
Rosaceae	*Alchemilla citrina* Frohner	H.	End.	LR	*		*
	Cerasus avium (L.) Moench	Meg.	M				*
	Crataegus microphylla C. Koch	Mic.	ES,IT		*	*	*
	Fragaria vesca L.	H.	ES		*	*	*

Family	Scientific name	Life form	Chorology	Risk species	*Quercus castaneifolia*	*Quercus macranthera*	Mixed
	Geum urbanum L.	H.	ES,IT,M		*		*
	Laurocerasus officinalis Roemer	Mic.	ES				*
	Malus orientalis Ugl.	Mes.	ES			*	
	Mespilus germanica L.	Mic.	ES,IT,M		*	*	*
	Potentilla rupestris L.	H.	ES,IT	LR	*		*
	Prunus divaricata Ledeb.	Mic.	ES,IT		*	*	*
	Pyrus hyrcana fedor.	Mic.	End.		*	*	*
	Rosa boissieri Crepin	Nan.	ES			*	*
	Rubus caesius L.	Nan.	ES		*		
	Rubus persicus Boiss.	Nan.	ES				*
	Rubus sanctus Schreber	Nan.	ES,IT,M		*	*	*
	Sorbus torminalis (L.) Crantz.	Mes.	ES		*	*	*
Rubiaceae	*Asperula odorata* L.	Cr.	ES		*	*	*
	Asperula taurina L. subsp. *caucasica* (Pobed.) Ehrend.	Cr.	End.	LR	*	*	*
	Cruciata laevipes Opiz	H.	ES,IT		*	*	*
	Cruciata taurica (pallas ex Willd.)Ehrend.	H.	ES,IT				*
	Galium caspicum Stev.	H.	ES		*	*	*
	Gallium sp.	Ch.			*	*	*
	Phuopsis stylosa (Trin.) Hook. F.	H.	ES		*		*
Scrophulariaceae	*Digitalis nervosa* Steud. & Hochst. Ex. Benth.	H.	ES,IT		*	*	*
	Lathraea squamaria L.	Cr.	ES				*
	Rhynchocorys maxima C.Richter	Cr.	ES,IT		*		*
	Verbascum sp.	H.			*		*
	Veronica officinalis L.	H.	ES		*		
	Veronica aucheri Boiss.	H.	End.	LR		*	*
Solanaceae	*Physalis alkekengi* L.	H.	ES		*		*
Solanaceae	*Solanum kieseritzkii* C.A.Mey.	H.	ES				*
Tiliaceae	*Tilia platyphyllos* Scop. Subsp *caucasica* (Rupr.)Loria	Meg.	ES				*
Ulmaceae	*Ulmus glabra* Hudson	Meg.	ES				*
Urticaceae	*Urtica dioica* L.	H.	CO				*
Violaceae	*Viola sieheana* W.Becker	H.	ES,IT		*	*	*
	Spermatophytes/Angiosperms/Monocotyledons						
Cyperaceae	*Carex hirta* L.	H.	ES		*	*	*
	Carex sylvatica Hudson	H.	ES		*	*	*
Dioscoraceae	*Tamus communis* L.	Cr.	ES		*		*
Iricaceae	*Crocus caspius* Fisch. & C.A.Mey.	Cr.	ES		*		*
Juncaceae	*Luzula multiflora* (Retz.) Lej.	H.	ES		*		*
Liliaceae	*Allium sp.*	Cr.			*	*	*
	Colchicum speciosum Steven	Cr.	End		*	*	*
	Erythronium caucasium Woron.	Cr.	ES	LR	*	*	*
	Lilium ledebourii (Barker) Boiss.	Cr.	End	VU	*	*	*
	Polygonatum orientalis Desf.	Cr.	ES,IT	LR			*
Orchidaceae	*Cephalanthera caucasica* Kranzl	Cr.	ES	LR	*	*	*
	Cephalanthera longifolia (L.) Fritsch.	Cr.	ES		*	*	*
	Cephalanthera rubra (L.) L. C. Rich.	Cr.	ES		*	*	*
	Dactylorhiza romana (Seb.)Soo. Subsp. *Georgica*	Cr.	ES,IT		*		
	Epipactis Heleborinum (L.) Crantz	Cr.	ES,IT		*	*	*
	Limodorum abortivum (L.) Swartz	Cr.	ES			*	

	Neottia nidus-avis (L.) L. C. Rich.	Cr.	ES		*		*
	Orchis mascula L.	Cr.	ES,IT	LR	*	*	*
	Platanthera bifolia (L.) L. C. Rich.	Cr.	ES		*	*	*
	Steveniella satyrioides (stev.) schltr.	Cr.	ES	LR	*	*	*
Poaceae	*Agropyron long-aristatum* (Boiss.) Boiss.	Cr.	ES,IT		*	*	*
	Brachypodium sylvaticum (Huds.)P.Beauv.	H.	ES		*	*	*
	Brachypodium pinnatum (L.) P. Beauv.	H.	ES,IT,M		*	*	
	Bromus benekenii (Lange)Trimen	H.	ES		*		*
	Bromus racemosus L.	H.	ES,IT,M		*		*
	Dactylis glomerata L.	H.	CO		*	*	*
	Pennisetum orientalis L. C. Rich.	H.	ES		*		*
	Poa nemoralis L.	H.	ES,IT,M		*	*	*

The biological form, on the basis of the classification of Raunkiaer (1934)
Mes. = Mesophanerophytes; Meg. =Megaphanerophytes; Mic. =Microphanerophytes;
Nan. =Nanophanerophytes; H. = Hemicryptophytes; Cr. = Cryptophytes; Th. =Therophytes;
Ch. =Chamaephytes; Ep. =Epiphytes;
Chorology
IT= Irano-Turanian; ES= Euro-Siberian; IT-M= Irano-Turanian, Mediterranean; M= Mediterranean; PI= Polyregional;
ES, IT= Euro-Siberian, Irano-Turanian; ES, M= Euro-Siberian, Mediterranean; Co= Cosmopolitan; End= Endemic;
ES-IT-M= Euro- Siberian- Irano-Turanian-Mediterranean
Conservation status of species
EN=Endangered; VU= Vulnerable; LR= Lower risk.

Table 2. *Quercus castaneifolia* and *Quercus macranthera* forest rare species in the study area.

Acer campestre L.	*Mentha pulegium* L.
Alnus subcordata C. A. Mey.	*Petasites hybridus* (L.) P.Gaertn.
Berberis integerrima Beg.	*Phyllitis scolopendrium* (L.) Newm.
Botrrychium lunaria (L.)Swartz	*Polypodium vulgare* L.
Cardamine quinquefolia (M. B.) Schmalh.	*Rubus caesius* L.
Cirsium oseticum (Adams) Petrak	*Rubus persicus* Boiss.
Cruciata taurica (pallas ex Willd.)Ehrend.	*Sedum stoloniferum* S.G.Gmel.
Dactylorhiza romana (Seb.) Soo. Subsp. *Georgica*	*Silene persicum* Boiss.
Dichrocephala integrifolia	*Silene schafta* Gmel.
Eupatorium cannabinum L.	*Solanum kieseritzkii* C.A.Mey.
Euphorbia sp.	*Tanacetum parthenium* (L.) Schultz
Geranium purpureum Vill.	*Urtica dioica* L.
Ilex aquifolium L.	*Veronica officinalis* L.

The frequency of the tree species was as follow: *Quercus castaneifolia* 53 percent, *Quercus macranthera* 20% and *Carpinus betulus* with 13.5 percent. And among the grass species *Brachypodium pinnatum* with 28 percent, and *Carex sylvatica* with 12.5% had the highest frequency.

Discussion

About 22% of the plant species of Iran are endemic to Iran (1727 species from 8,000 species). Considering low surface area, it can be said that the studied region with 186 plant species, diversity and species richness is important because it contains 0.6 percent of endemic species of Iran and among the mentioned species, one species is endangered, 5 species are vulnerable and 20 species are Lower Risk. However, in the Vavsr (with area of 8000 hectares), 167

species (FathiVavsary S. 2003) and in Vaz (with 5,000 hectares) 237 species (Akbarzadeh M. 2007) and in the northern slope of the study area, (with 15,000 hectares), 339 species (Naghinezhad, 2010) were introduced. This region belongs to Europe-Siberia (areas Caspian), and contains 41% of species. Moving toward the ridge and height the presence of the Iran-Turanian vegetative elements increase (Akbarnia M, *et al.*, 2004; and Atashgahi *et al.*, 2009). Forest destruction significantly increase in Therophytes population (Amiri S, *et al.*, 2008). Lower Therophytes (8 %) indicated intact and virgin oak forests in the region. The abundance of Hemicryptophytes and Cryptophytes represents cool mountainous and temperate climate (Akbarzade M, 2007; and Amiri S, *et al.*, 2008; and Keshtkar HR, *et al.*, 2011) and (Mobayen S, 1981) In the region. In the current research 41 percent of Hemicryptophytes, 20% of Cryptophytes and 19% of Phanerophytes, indicating a cold mountainous and temperate climates. Due to the high slope and shallow soil at the area, Hemicryptophytes and Phanerophytes play an important role in stabilizing the soil in sloping areas and it is very effective biological spectrum. Asteraceae, Rosaceae, Papilionaceae, Lamiaceae, Orchidaceae and Poaceae Families respectively are abundant in oak habitat. (Atashgahi Z, *et al.*, 2009; Razavi A, and Abbasi H, 2009; Amiri S, *et al.*, 2008; Keshtkar HR, *et al.*, 2011; Akbarzade M, 2007; Naghinezhad *et al*, 2010 & 2012; and Falah F, *et al*, 2009). The above families' are more abundant elements in the forest areas except Orchidaceae families, although some families show differences in proportion in each region. But these results which are specific to oak stands, in the oak habitats are related to existing differences in the region. Maximum abundance of the Orchidaceae families (47 %) is in the studied region. however, it was not reported in none of the previous researches as one of the most abundant families. This family is sensitive to destruction. Increase the Orchidaceae family, is another reason for virginity of the oak forests in this region. Usually a forest type penetrate inside the another type and forms Ecoton or spectral, as well forest type change gradual from one type to another type. (Mesdaghi M, 2001). The Study of the vegetation in each of pure type *Q. castaneifolia* and pure type *Q. macranthera* and mixed oak types (Table 1) showed that: 45% of all species can be observed in three types of oak. 17 percent of species in in mixed stands of oak, 5% in pure *Q. castaneifolia* forest,

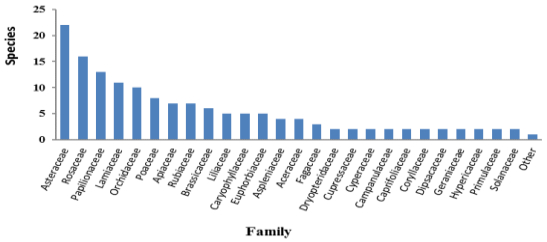

Fig. 2. Frequency of the plant family and species in Oak forest.

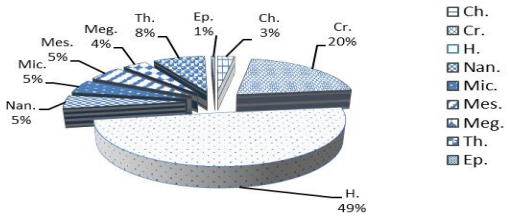

Fig. 3. The Life form of the oak forests (*Quercus castaneifolia* and *Quercus macranthera*).

Mes.=Mesophanerophytes;
Meg.=Megaphanerophytes;
Mic.=Microphanerophytes;
Nan.=Nanophanerophytes; H.= HemiCryptophytes; Cr.= Cryptophytes; Th.=Therophytes; Ch.=Chamaephytes; Ep.=Epiphytes;

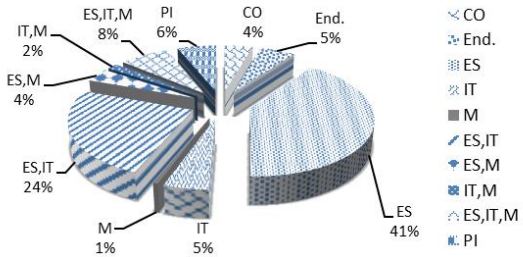

Fig. 4. View Chorology frequency of the oak forests of *Quercus castaneifolia* and *Quercus macranthera*.

IT= Irano-Turanian; ES= Euro- Siberian; M= Mediterranean; IT-M= Irano-Turanian-Mediterranean; ES, IT= Euro- Siberian-Irano-Turanian; ES, M= Euro-Siberian-Mediterranean; Co= Cosmopolitan; PI= Polyregional; End= Endemic; ES-

IT-M= Euro- Siberian- Irano-Turanian-Mediterranean

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