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Floristic study of the rangeland Gugerd region in Khoy city (West Azarbaijan Province, NW Iran)

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Abstract

Gugerd rangelands located in 35 km northwest of Khoy city due to the specific conditions of climate, topography have upper biodiversity and species richness. In this research for the first time, the floristic compositions of the region were studied. To study this region flora, plant samples were collected from different parts of the region from May to late October in 2013 and then by using of the available resources plant samples were identified. Studies showed which flora of this region includes 278 plant species belonging to 166 genera and 49 families from the vascular plants. Among the existence family in the region, *Asteraceae* family with 19 genera and 41 species is the biggest family, and among the genera, *Astragalus* genus from *Leguminosae* (*Fabaceae*) family, with 15 species were detected as the most various ones. Studying of plant life forms by Raunkiaer method showed that Hemicryptophytes with 48% and Therophytes with 20% were the dominant life forms of a region. Also, the chorological study indicated that 59.7 percent of plants chorotype belonged to Irano – Turanian region. Moreover, in this research, the scientific name, the rare and endemic species, have been determined by using of the available resources. The results showed that, 26 identified species in this region (9.3 percent of total identified species in region) were endemic species of Iran and let it not remain unsaid that 15 species were rare and endangered (5.3% of the total species in region). These plants need a strong conservation and protection management since the fragile ecosystems are often very restricted, small and isolated, However overgrazing is still a common threat.

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Introduction

Iran is a vast country with an area of 1648000 square kilometers due to the specific conditions of topography and weather conditions consist biological and ecological diversity which has created many species diversity in different regions. Hence, Rich and diverse flora of Iran consist of a large number of families and genera where many of them are highly showy and attract both professional and amateur botanists and has been attracted the attention of domestic and foreign researchers which can be noted botanist such as Parsa, 1943-1960; Rechinger, 1963-2005; Zohary, 1973; Mobayen, 1979-1996; Assadi *et al*, 1988- 2009; Maasoumi., 1989-2005, which many plant samples collected from different areas and identified.

In recent decades, researches on floristic studies approximately in the same range with this study region have been done in Iran. Ghahraman and Attar (1998) in Biodiversity of plant species in Iran, announced that number of known plant species in whole Iran is nearly 7,600 species. Razavi and Hassan Abbasi (2009) in Floristic and Chorology Investigation of Sourkesh Reserve in Golestan Province stated that Identifying vegetation and phytochorology study in a region is the base of ecological studies and researches and also it is one of the appropriate methods to determine ecological capacity of each region. Atashgahi *et al* (2009) in Study of floristics, life form and chorology of plants in the east of Dodangeh forests of Mazandaran province investigated which identifying plant ingredients in a region cover has regarded as a study of infrastructure for ecological research, management and protection of plants. Therefore, floristic studies like certificates that represent the past and present Status in a region, and also play an important role in future Predictions. This study aims to identify and provide a floristic list of region plants, life forms, chorotype, and the identification of rare and endangered plants in the region which on the base of the mentioned results, endemic and important species were detected for

improving, developing and utilizing region by-products. So, this study, the way is provided for further research of protection aspects, biochemical, geographic and nvironmental species mentioned. Finally, the species collected from the region will help to the herbarium richness of natural resources faculty herbarium and other herbarium in province.

Materials and methods

The study region

In this study, Gugerd region was chosen as the research study. The Gugerd region with 4230 hectares and located 35km northwest of Khoy city, with geographical coordinates 44°31'48" to 44°35'40" east longitude and 38°29'11" to 38°32'18" north latitude, and altitude ranging from 1820 to 3000 meters above sea level on the southern slopes of the Avrin mountains (see Figure 1).

According to weather, the average annual rainfall is 469 mm and the average annual temperature is 7.08°C in Gugerd region. Regional climate based on reformed De-Martonne method, is semi-moist and ultra-cold, which 150 days out of a year in area is frigid (Odisho., 1997). According to tectonic map of Iran (Stocklin and Nabavi, 1972), Gugerd region located in Khoy ophiolite zone and includes igneous, metamorphic and sedimentary rocks of Mesozoic and Cenozoic eras (Darvishzadeh., 2006). Study region has shallow and semi-deep soils of non-uniform with rocky outcrops. Landslides erosion can be seen in some parts of the region (Saber., 1989).

Methods

In order to introduce the region flora, land survey way was used. It is one of conventional taxonomy studies of the region (Mesdaghi., 2001). In this method, with a direct presence in the study region, vegetation samples from 1820 to 3000 meters above sea level collected, pressed and dried. At the end herbarium specimens were prepared. Therefore, the identification and distribution of species chorotype were performed in the use of Flora Iranica (Rechinger., 1963-2005), Flora of Turkey (Davis.,

1965–1988), Flora of Iran (Assadi *et al*, 1988-2009), Flora of Iran (Mobayen; 1979 - 1996), Colored flora of Iran (Ghahraman., 1977-2006), Forests, Trees and shrubs of Iran (Sabeti, 1976), Plant Taxonomy (Mozaffarian., 2000) and The genus *Astagalus* in Iran (Massoumi., 1989 - 2005).

For the classification of life forms, Raunkiaer classification because of its applicability was used. Finally, endemic species, and also rare and endangered species were determined according to Biodiversity of plant species in Iran (Ghahraman & Attar., 1999).

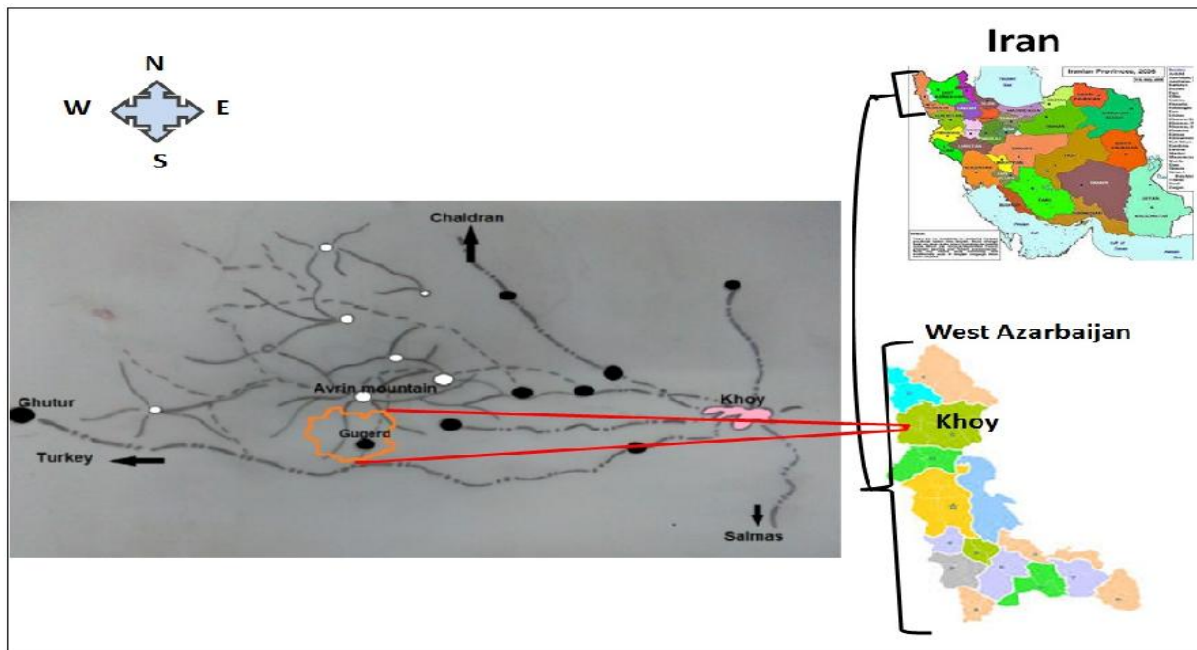


Fig. 1. Geographical location map of Gugerd region.

Results

In this research, 278 species of Vascular plants, belonging to 166 genera and 49 families, were known in Gugerd region of Khoy, which Dicotyledons with 238 species were richest and Monocotyledons with 37 species, Gymnosperms with 2 species and Vascular

Cryptogams with 1 species attended. These figures represent only species without considering the intraspecific taxa. The herbarium samples supplied from assembled samples has been kept in the natural resources faculty herbarium of university urmia (see Table 1).

Table 1. The floristic list of identified taxa in Gugerd region.

Family and Scientific name	Chorotype	Life form
Amaryllidaceae		
<i>Ixiolirion tataricum</i> (Pall.)Herb.	IT, ES	Cr
Apiaceae (Umbelliferae)		
<i>Astrodaucus orientalis</i> (L.) Drudes.	IT, ES	He
<i>Chaerophyllum bulbosum</i> L.	IT	He
<i>Chaerophyllum crinitum</i> Boiss.	IT	He
<i>Eryngium billardieri</i> F.Delaroche	IT	He
<i>Falcaria vulgaris</i> Bernh.	IT	He
<i>Heracleum pastinacifolium</i> C. Kock.	IT, ES	He
<i>Libanotis transcaucasica</i> Schischk.*	IT	He
<i>Pimpinella tragium</i> Vill.	IT	He
<i>Prangos uloptera</i> DC.	IT	He
Asteraceae (Compositae)		

<i>Achillea millefolium</i> L.	IT, ES	Cr
<i>Achillea nobilis</i> L.	IT, ES	He
<i>Achillea tenuifolia</i> Lam.	IT	He
<i>Achillea vermicularis</i> Trin.	IT	He
<i>Achillea wilhelmsii</i> C. Koch.	IT	He
<i>Artemisia austriaca</i> Jacq.	IT, ES	Ch
<i>Artemisia vulgaris</i> L.	IT, ES	Ch
<i>Carduus seminudus</i> M. B.	IT, ES	He
<i>Centaurea dimirezii</i> Wagenitz**, *	IT	He
<i>Centaurea eriocephala</i> Boiss & Reut.	IT	He
<i>Centaurea glastifolia</i> L.	M	He
<i>Centaurea pseudoscabiosa</i> Boiss.	IT	He
<i>Centaurea pseudosinaica</i> Czerep.	PL	He
<i>Centaurea triumfettii</i> All.	PL	He
<i>Centaurea virgata</i> Lam.	IT	He
<i>Cirsium elodes</i> M. B.	IT	He
<i>Cirsium rhizocephalum</i> C. A. Mey.	IT	Th
<i>Cousinia eriocephala</i> Boiss. & Hausskn.**	IT	Ch
<i>Echinops ritrodes</i> Bunge.*	IT	He
<i>Erigeron acer</i> L.	IT	He
<i>Helichrysum plicatum</i> DC.	IT	Ch
<i>Helichrysum pseudoplicatum</i> Nab.	IT	He
<i>Inula montbretiana</i> DC.**	IT	Cr
<i>Inula oculus - christi</i> L.	IT, ES	He
<i>Leontodon asperrimus</i> (Willd.) Boiss ex Ball.	IT, ES	He
<i>Scariola orientalis</i> (Boiss.) Sojak.	IT	He
<i>Scrozonera stenocephala</i> Boiss.*	IT	Cr
<i>Senecio pseudo-orientalis</i> Schischk.	PL	He
<i>Senecio vernalis</i> Waldst & Kit.	IT	He
<i>Serratula radiata</i> (Waldst & Kit.) M. B.	IT, ES	He
<i>Tanacetum balsamita</i> L.	IT, ES	Cr
<i>Tanacetum chiliophyllum</i> (Fisch. & C. A. Mey.) Schultz-Bip.**	IT	He
<i>Tanacetum kotschy</i> (Boiss.) Grievson.	IT	He
<i>Tanacetum parthenifolium</i> (Willd.) Schultz-Bip.	IT	Cr
<i>Tanacetum polycephalum</i> Schultz-Bip.	IT	He
<i>Tanacetum uniflorum</i> (Fisch. & C. A. Mey. ex DC.) Schultz. Bip.	IT	Ch
<i>Taraxacum syriacum</i> Boiss.	IT	He
<i>Tragopogon collinus</i> DC.	IT, ES	He
<i>Tragopogon graminifolius</i> DC.	IT	He
<i>Tussilago farfara</i> L.	Cosm	He
<i>Xeranthemum longipapposum</i> Fisch. & C. A. Mey.	IT	Th
Berberidaceae		
<i>Berberis integerrima</i> Bge.	IT	Ph
Boraginaceae		
<i>Alkanna orientalis</i> (L.) Boiss.	IT	He
<i>Anchusa arvensis</i> (L.) M. B.	Cosm	Th
<i>Cerinthe minor</i> L.	ES	He
<i>Heliotropium europaeum</i> L.	IT	Th
<i>Lappula barbata</i> (M.B) Gurke.	IT	He
<i>Lappula patula</i> (Lehm.) Ascherson ex Gurke.	PL	Th
<i>Myosotis asiatica</i> (Vesterg) Schischk. & Serg.	PL	Th
<i>Myosotis palustris</i> (L.) Nath.	IT, ES	Th
<i>Nonnea persica</i> Boiss.*	IT	He
<i>Onosma sabalanicum</i> Ponert.**	IT	He
<i>Onosma orientale</i> L.	IT, M	He
Brassicaceae (Cruciferae)		
<i>Aethionema elongatum</i> Boiss.	IT	Ch
<i>Aethionema grandiflorum</i> Boiss. & Hohen.	IT	He
<i>Aethionema stenopterum</i> Boiss.*	IT	Th
<i>Aethionema trinervium</i> (DC.) Boiss.	IT	Th

<i>Alyssum bracteatum</i> Boiss. & Buhse.*	IT	He
<i>Alyssum repens</i> Bung.**	IT, ES	Th
<i>Arabis caucasica</i> Willd.	IT	He
<i>Barbarea plantaginea</i> DC.	PL	Th
<i>Cardamine uliginosa</i> M.B.	IT	Th
<i>Cardaria draba</i> (L.) Desv.	M	Th
<i>Conringia perfoliata</i> (C. A. Mey.) Busch.	IT, ES	Th
<i>Crambe orientalis</i> L.	IT	He
<i>Didymophysa aucheri</i> Boiss.	IT	He
<i>Draba rosularis</i> Boiss.	IT	Ch
<i>Eruca sativa</i> Lam.	M	Th
<i>Erysimum crassipes</i> Fisch. & C. A. Mey.	IT	He
<i>Erysimum nanum</i> Boiss & Hohen.*	IT	He
<i>Erysimum pulchellum</i> (Willd.) J. Gay.	IT	He
<i>Hesperis kurdica</i> Dvorak et Hadac.	IT	He
<i>Isatis cappadocica</i> Desv.	IT	Th
<i>Isatis lusitanica</i> L.	IT	He
<i>Matthiola alyssifolia</i> (DC.) Bornm.	IT	He
<i>Sisymbrium loeselii</i> L.	IT	He
<i>Sterigmostemum sulphureum</i> (Banks & Soland.) Bornm.	PL	He
<i>Thlaspi tenue</i> (Boiss & Buhse.) Hedge.*	IT	Th
Campanulaceae		
<i>Asyneuma lanceolatum</i> (Willd.) Hand.- Mzt.	IT	He
<i>Asyneuma pulchellum</i> (Fisch. & Mey.) Bornm	IT	He
<i>Campanula coriacea</i> Davis.	IT	He
<i>Campanula glomerata</i> L.	IT, ES	He
<i>Campanula phytidocalyx</i> Boiss. & Noe.	IT	He
<i>Campanula propinqua</i> Fisch. & Mey.*	IT	Th
<i>Campanula rapunculus</i> L.	IT, M	He
<i>Campanula stevenii</i> M. B.	IT	He
Capparaceae		
<i>Cleome noeana</i> Boiss.	IT, ES	Th
Caprifoliaceae		
<i>Lonicera iberica</i> M. B.	ES	Ph
Caryophyllaceae		
<i>Arenaria gypsophiloides</i> L.	IT, ES	He
<i>Cerastium glutinosum</i> Fries.	IT, M	He
<i>Dianthus cretaceus</i> Adams in Weber & Mohr.	IT	He
<i>Dianthus crinitus</i> Smith.	IT, ES	He
<i>Gypsophila iranica</i> Barkoudah.*	IT	Th
<i>Holosteum umbellatum</i> L.*	IT	Th
<i>Lepyrodiclis holosteoides</i> (C. A. Mey) Fenzl ex Fisch.	IT	Th
<i>Scleranthus orientalis</i> Rossier.	IT	Th
<i>Silene araratica</i> Schischk.	IT	He
<i>Silene chlorifolia</i> Sm.	IT	He
<i>Silene latifolia</i> Poir.	IT	He
<i>Silene meyeri</i> Fenzl et Boiss.*	IT	Ch
<i>Silene spergulifolia</i> (Willd.) M. B.	IT	He
<i>Silene swertiifolia</i> Boiss.	IT	He
<i>Silene vulgaris</i> (Moench) Garcke.	IT	He
<i>Vaccaria grandiflora</i> (Fisch. Ex DC.) Jaub. & Spach.	IT	Th
Chenopodiaceae		
<i>Chenopodium foliosum</i> (Moench) Aschers.	PL	Th
Convolvulaceae		
<i>Convolvulus arvensis</i> L.	IT	Cr
<i>Convolvulus lineatus</i> L.	IT	Cr
Crassulaceae		
<i>Sedum album</i> L.	IT, ES	He
Cupressaceae		
<i>Juniperus communis</i> L.	ES	Ph

<i>Juniperus excelsa</i> M. B.	IT, ES	Ph
Cyperaceae		
<i>Carex acutiformis</i> Ehrh.	IT	Cr
<i>Carex pachystylis</i> J. Gay.	IT, ES	He
<i>Carex tomentosa</i> L.	IT	He
Dipsacaceae		
<i>Cephalaria hirsuta</i> Stapf.	IT	He
Elaeagnaceae		
<i>Hippophae rhamnoides</i> L.**	ES	Ph
Equisetaceae		
<i>Equisetum ramosissimum</i> Desf.	IT, ES	He
Euphorbiaceae		
<i>Euphorbia macroclada</i> Boiss.	IT	He
<i>Euphorbia seguieriana</i> Neck.	Cosm	He
<i>Euphorbia boissieriana</i> (Woron) Prokh.	IT, ES	He
Fabaceae (Leguminosae)		
<i>Astragalus allysoides</i>	IT	Ch
<i>Astragalus beckii</i> Bornm.	IT	Th
<i>Astragalus cancellatus</i> Bunge.	IT	He
<i>Astragalus chichestianus</i>	IT	Ch
<i>Astragalus cyclophylon</i> Beck.	IT	Ch
<i>Astragalus effuses</i> Bunnge.*	IT	Ch
<i>Astragalus grominocalyx</i> Boiss. & Hohenm.	IT	Th
<i>Astragalus leiophyllus</i> Freyn. et Born.	IT	Ch
<i>Astragalus leporinus</i>	IT	Th
<i>Astragalus macrostachys</i> DC.	IT	Ch
<i>Astragalus marooti</i> Podlech & Maassoumi.	IT	Ch
<i>Astragalus monspersulanum</i>	IT	Ch
<i>Astragalus odoratus</i> Lam.	IT	Ch
<i>Astragalus tehranicus</i> Boiss.	IT	Ch
<i>Astragalus yueksekovae</i> Matthews.	IT	Ch
<i>Coronilla varia</i> L.*	IT	He
<i>Lotus corniculatus</i> L.	IT	Th
<i>Onobrychis altissima</i> Grossh.	PL	He
<i>Onobrychis cornuta</i> (L.) Desv.	IT, ES	Th
<i>Onobrychis hohenackeriana</i> C. A. Mey.	IT	He
<i>Onobrychis megataphros</i> Boiss.**	IT, ES	He
<i>Oxytropis persica</i> Boiss.*	IT	He
<i>Trifolium pratense</i> L.	PL	He
<i>Vicia hypoleuca</i> Boiss.	IT	He
<i>Vicia variabilis</i> Willd.	IT, ES	He
<i>Vicia variegata</i> Willd.	IT, ES	Th
<i>Vicia villosa</i> Roth.	IT, ES	Th
Fumariaceae		
<i>Corydalis verticillaris</i> DC.*	IT	Cr
<i>Fumaria asepala</i> Boiss.	IT	Th
Gentianaceae		
<i>Gentiana olivieri</i> Griseb.	IT	Th
Geraniaceae		
<i>Erodium armenum</i> (Trautv.) Woron.	IT	He
<i>Erodium cicutarium</i> (L.) L'Her. Ex Aiton.	PL	Th
<i>Geranium pratense</i> L.	Cosm	He
<i>Geranium tuberosum</i> L.	IT, ES	Cr
Hypericaceae (Gutiferae)		
<i>Hypericum scabrum</i> L.	IT	He
Iridaceae		
<i>Iris caucasica</i> Hoffm.	IT	Cr
Juncaceae		
<i>Juncus articulatus</i> L.	IT, ES	He
<i>Juncus inflexus</i> L.	IT, ES	Cr

Juncaginaceae		
<i>Triglochin maritima</i> L.	Cosm	Cr
Lamiaceae (Labiatae)		
<i>Ajuga chamaecistus</i> Ging.*	IT	Ch
<i>Ballota nigra</i> L.**	ES	He
<i>Brunella vulgaris</i> L.	ES, M	Cr
<i>Dracocephalum multicaule</i> Montbr.	IT	Ch
<i>Lamium galeobdolon</i> (L.) L.	ES	Cr
<i>Marrubium astracanicum</i> Jacq.	IT	Ch
<i>Mentha longifolia</i> (L.) Hudson, var. <i>Petiloata</i> Boiss.	ES	Cr
<i>Nepeta betonicifolia</i> C. A. May.	IT, ES	He
<i>Nepeta fissa</i> C. A. Mey.	IT	Ch
<i>Nepeta haussknechtii</i> Bornm.*	IT	He
<i>Phlomis olivieri</i> Benth.*	IT	He
<i>Phlomis tuberosa</i> L.	IT, ES	He
<i>Salvia atropatana</i> Bunge.	IT	He
<i>Salvia nemorosa</i> L.	IT, ES	He
<i>Salvia staminea</i> Montbr. & Auch. ex Benth.	IT	He
<i>Salvia verticillata</i> L.	IT, ES	He
<i>Scutellaria pinnatifida</i> A. Hamilt.	IT	Ch
<i>Stachys iberica</i> M.B.	IT	He
<i>Stachys lavandulifolia</i> Vahl.	IT	Ch
<i>Teucrium orientale</i> L.	IT	Ch
<i>Teucrium polium</i> L.	IT, M	Ch
<i>Thymus kotschyanus</i> Boiss. & Hohen.	IT	Ch
<i>Thymus migricus</i> Klokov. & Desj-Shost.	IT	Ch
<i>Ziziphora clinopodioides</i> Lam.	IT	Ch
<i>Ziziphora persica</i> Bunge.	IT, ES	Th
Liliaceae		
<i>Allium Akaka</i> Gmelin.	IT	Cr
<i>Allium rubellum</i> M.B.	IT	Cr
<i>Bellevalia glauca</i> (Lind.) Kunth.*	IT	Cr
<i>Colchicum szovitsii</i> Fisch & C. A. Mey.	IT	Cr
<i>Fritillaria kotschyana</i> Herbert.*	IT	Cr
<i>Gagea reticulate</i> (Pall.) Schultes.	IT	Cr
<i>Puschkinia scilloides</i> Adams.	IT	Cr
<i>Tulipa florenski</i> Worn.**	IT, ES	Cr
<i>Tulipa Montana</i> Lind. Var. <i>Chrysantha</i> (Boiss.) Wendelbo.	IT, ES	Cr
<i>Tulipa stylosa</i> Stapf.	IT, ES	Cr
Linaceae		
<i>Linum mucronatum</i> Bertol.	IT, ES	Th
<i>Linum nervosum</i> Waldst & kit.	IT, ES	Th
<i>Linum usitatissimum</i> (Boiss.) Rech.**	IT	Th
Malvaceae		
<i>Alcea koelzii</i> L.*	IT	He
Onagraceae		
<i>Epilobium frigidum</i> Hausskn.	Cosm	He
<i>Epilobium ponticum</i> Hausskn.	IT	Cr
Orchidaceae		
<i>Dactylorhiza umbrosa</i> (Kar & Kir.) Nevski.	IT	Cr
<i>Orchis palustris</i> Jack.	IT, ES	Cr
Papaveraceae		
<i>Papaver dubium</i> L.	ES	Th
<i>Papaver orientale</i> L.	IT	He
Plantaginaceae		
<i>Plantago lanceolata</i> L.	ES	He
Plumbaginaceae		
<i>Acantholimon fominii</i> Kusn.**	IT	Ch
<i>Acantholimon karelinii</i> (Stschegl.) Bge.	IT	Ch
<i>Acantholimon wendelboi</i> Rech. F. & Schiman – Czeeika.**,*	IT	Ch

Poaceae (Graminae)		
<i>Agropyrum imbricatum</i> (M. B) Roemer & Schultes.	IT	Cr
<i>Agropyrum tauri</i> Boiss & Bal.	IT, M	He
<i>Agropyrum trichoporum</i> (Link) Richter.	ES, M	Cr
<i>Alopecurus aucheri</i> Boiss.	IT, ES	He
<i>Alopecurus pratensis</i> L.	IT	Th
<i>Bromus danthoniae</i> Trin.	IT	Th
<i>Bromus erectus</i> Hudson.**	IT, M	Th
<i>Bromus tectorum</i> L.	ES	Th
<i>Calamagrostis pseudophragmites</i> (Hall. f.) Koel.	PL	Th
<i>Dactylis glomerata</i> L.	IT, ES	Cr
<i>Festuca ovina</i> L.	IT, ES	Th
<i>Koeleria cristata</i> (L.) Pers.	Cosm	He
<i>Oryzopsis holciformis</i> (M. B.) Hack.	IT, M	Cr
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	PL	Cr
<i>Poa angustifolia</i> L.	M	Cr
<i>Poa bulbosa</i> L. var <i>vivipora</i> .	PL	Cr
<i>Poa trivialis</i> L.	IT, ES	He
Polygalaceae		
<i>Polygala anatolica</i> Boiss. & Hrdl.	PL	Th
Polygonaceae		
<i>Rumex scutatus</i> L.	IT	Ch
Primulaceae		
<i>Androsace armeniaca</i> Duby.	IT, ES	He
<i>Primula auriculata</i> Lam.	IT	He
Ranunculaceae		
<i>Adonis aestivalis</i> L.	IT	Th
<i>Delphinium speciosum</i> M. B.	IT	He
<i>Ficaria kochii</i> (Ledeb.) Iranshahr & Rech.	IT, ES	He
<i>Pulsatilla albana</i> (Stev.) Bercht. & Presl.	ES	He
<i>Ranunculus arvensis</i> L.	IT	Th
<i>Thalictrum minus</i> L.	IT	He
Resedaceae		
<i>Reseda lutea</i> L.	IT	Th
Rosaceae		
<i>Alchemilla pseudo-cartalinica</i> Juz.	IT	He
<i>Amygdalus urumiensis</i> (Bornm.) Browicz.*	IT	Ph
<i>Cotoneaster ovata</i> Pojark.	IT	Ph
<i>Crataegus pseudoheterophylla</i> A. Pojark.	IT	Ph
<i>Potentilla recta</i> L.	IT, ES	He
<i>Pyrus salicifolia</i> Pall.	IT	Ph
<i>Rosa canina</i> L.	IT	Ph
<i>Rosa foetida</i> Herrm.	IT	Ph
<i>Sanguisorba minor</i> Scop.	IT, ES	Ch
Rubiaceae		
<i>Asperula glomerata</i> (M. B.) Griseb.	IT	He
<i>Crucianella gilanica</i> Trin.	IT, ES	Th
<i>Cruciata taurica</i> (Pallas ex Willd.) Ehrend.	IT	Ch
<i>Galium mite</i> Boiss. & Hohen.	IT	Ch
<i>Galium verum</i> L.	IT	He
Scrophulariaceae		
<i>Bungea trifida</i> (Vahl.) C.A.Mey.	IT	He
<i>Pedicularis sibthorpii</i> Boiss.	IT, ES	He
<i>Rhinanthus vernalis</i> (Zing.) Schischk.	PL	Th
<i>Scrophularia azarbijanica</i> Grau.	IT, ES	He
<i>Scrophularia scariosa</i> Boiss.	IT, ES	He
<i>Scrophularia striata</i> Boiss.	IT, ES	Th
<i>Scrophularia umbrosa</i> Dumort.	IT, ES	He
<i>Verbascum oreophilum</i> L.	IT, ES	He
<i>Veronica anagalis-aquatica</i> L.**	IT	Th

<i>Veronica kurdica</i> Benth.*	IT	He
<i>Veronica orientalis</i> Miller.	IT	Ch
Solanaceae		
<i>Hyoscyamus kurdicus</i> Bornm.	IT	He
<i>Hyoscyamus niger</i> L.	IT, ES	He
<i>Hyoscyamus reticulatus</i> L.	IT, ES	He
Typhaceae		
<i>Typha latifolia</i> L.	ES	Cr
Urticaceae		
<i>Parietaria judaica</i> L.	PL	Cr
<i>Urtica dioica</i> L. subsp <i>Kurdistanica</i> Chrtek.	PL	Cr
Valerianaceae		
<i>Valerianella cymbicarpa</i> C.A.Mey.	IT	Th
<i>Valerianella plagiostephana</i> Fisch.	IT, ES	Th

*; Endemic species, **; Rate and Endangered species, Th; Therophyte, He; Hemicryptophyte, Ch; Chamaephyte, Cr; Cryptophyte and Ph; Phanerophyte, IT; Irano–Turanian, ES; Europe–Siberian, M; Mediterranean, Cosm; cosmopolitan, PL; plurality.

Among the existence family in the region, *Asteraceae* with 19 genera, 41 species is the most common angiosperm family in Gugerd region flora, followed by *Fabaceae* with 7 genera, 27 species, *Brassicaceae* (17, 25) *Lamiaceae* (15, 25), *Poaceae* (10, 17), *Caryophyllaceae* (9, 16), *Boraginaceae* (8, 11), and *Scrophulariaceae* (5, 11), respectively, which totally covers 62.2% of species (see Figure 2).

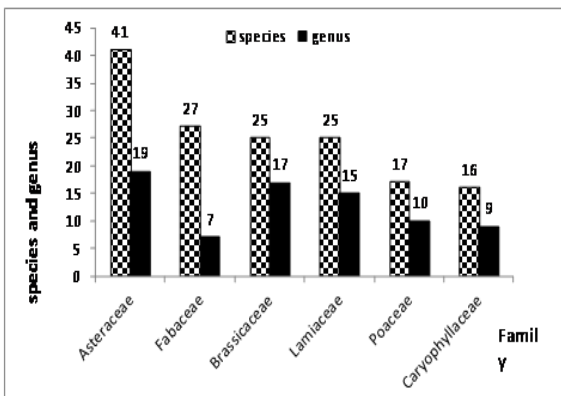


Fig. 2. The number of genera and species of the richest plant families in Gugerd region. The largest genera in Gugerd region were genus *Astragalus* with 15 species, *Centaurea* 7, *Silene* 7, *Tanacetum* 6, *Campanula* 6 and *Achillea* 5 species (see Figure3).

Classification of plant life forms by Raunkiaer method suggests that Hemicryptophytes 48%, Therophytes 20%, Cryptophytes 14.4%, Chamaephytes 13.7% and Phanerophytes 4% of the life forms allocated to themselves (see Figure 4).

The results of Chorotype species showed that the

Irano–Turanian area with 59.7% is the highest and then Irano–Turanian/Europe–Siberian (22.3%), plurality (6.5%), Euro–Siberian (4.3%), cosmopolitan and Mediterranean/Irano–Turanian each (2.5%), Mediterranean (1.5%) and Europe–Siberian/Mediterranean (0.7 %) of the share allocated to Chorotype (see Figure 5). It should be noted that in this study, Iran endemic species placed in the Irano–Turanian area. And also, for having easier, species that are present in more than two vegetation area, in Figure (5) plurality area (PL) were considered.

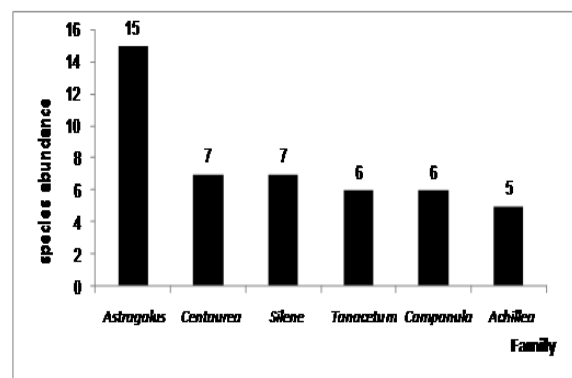


Fig. 3. The large genera of plant available in the Gugerd region.

The results showed that, among the 278 identified species, 26 species (9.3% of the total species) were identified endemic species of Irano–Turanian area, which was shown with * in Table (1). Also in this study, 15 rare and endangered species (5.3% of the

total species) were recognized which was shown with ** in Table (1).

Discussion

The Chorotype of plant species in a region reflects the influence of the different vegetation areas (Kashipazha *et al.*, 2004). Since, the study area phytogeography is located in the Irano–Turanian area, (Yousefi, 2006), the presence of a high percentage of Irano–Turanian ingredients is not far-fetched, and the highest number species (59.7%) have been allocated to themselves. According to (Hedge & Wendelbo, 1978), one of the most prominent features in the Irano–Turanian area is the existence of various genera such as *Astragalus*, *Centaurea* and *Silene* which include a large number of species. A significant proportion of plant ingredients of Irano–Turanian / Europe–Siberian area (22.3%) in the study region represented the influence of the study region from Euro - Siberian area.

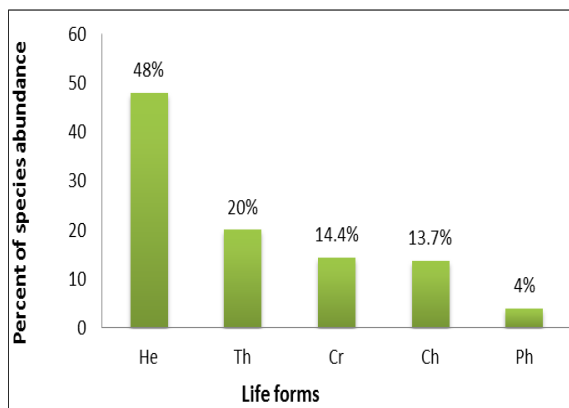


Fig. 4. The Column Chart of species Life forms percentage in Gugerd region. [Th; Therophyte, He; Hemicryptophyte, Ch; Chamaephyte, Cr; Cryptophyte and Ph; Phanerophyte].

The life forms of plant, both shows their taxonomy features and reflects Plants adaption with the environmental conditions. The structuring and plant life form similarity a region indicates their compatibility with habitat conditions for the use of environmental resources in the habitat (Pairanj *et al.*, 2011). As it can be seen in Figure 3, Hemicryptophytes constitute 48% of life forms of plant species in the study region. According Archibold

theory (1996) abundance of Hemicryptophytes plants in a region indicates cold and mountainous climate. The abundance of Hemicryptophytes plants in a region can be considered the compatibility of the plants against cold and grazing. Considerable presence of some species of the families such as *Asteraceae*, *Brassicaceae*, *Lamiaceae* and *Boraginaceae* may represent the chaos and destruction of vegetation in the habitat (Asri ea al., 2013). On the other hand, these results correspond with Raunkiaer results (1934), which states that Hemicryptophytes the humid and cold climate of altitudes or higher latitudes.

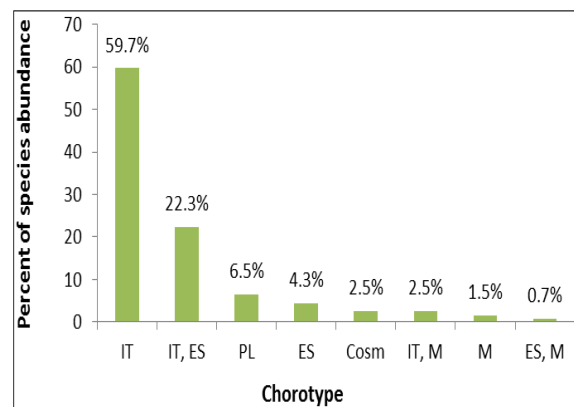


Fig. 5. The Column Chart of percent of Chorotype in Gugerd region. [IT; Irano–Turanian, ES; Europe–Siberian, M; Mediterranean, Cosm; cosmopolitan, PL; plurality].

The results indicated that in Gugerd region of Khoy, from the 278 identified species, 26 species, i.e., 9.3 % of the total of identified species, are Iran endemic species. So in a nutshell, from 7576 identified species in Iran, 1810 species are Iran endemic species of flora (Ghahraman & Attar, 1999). Gugerd region in Khoy despite having little area, is allocated 1.43% of Iran endemic flora to itself, which this confirms the need for protection of this region over and over. In Table 1, these species are determined with * marked.

In this study, 15 species of rare and endangered (3/5% of the total species) were known. Whatever the plants of a region have more common with other major vegetation area of the world, worry will be reduced about the extinction of plant species of that

region, because it will increase the hope to return, and reintegration, but plants that belonged to particular vegetation area, if this plants encounter to extinction risk, the likelihood of their reintegration will decrease (Pairanj *et al.*, 2011). Since, the study region is typical of Irano-Turanian area, maintaining of genetic resources appear over and over. The species are shown with ** marked in Table 1.

Generally, our results suggested that the most present species in the region were species permanent species that indicate perennial species indicating adaptation to climatic and soil conditions in the region.

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