

Vegetation and habitats conservation in Talesh Mountains Protected Areas

Mahmoud Bidarlord

*Department of Plant Sciences, Faculty of Biological Sciences, Kharazmi University, Tehran, Iran; Postal Code
15719-14911, Tehran, Iran. E-mail: bidar.zist@gmail.com*

Farrokh Ghahremaninejad

*Department of Plant Sciences, Faculty of Biological Sciences, Kharazmi University, Tehran, Iran; Postal Code
15719-14911, Tehran, Iran. E-mail: ghahremaninejad@khu.ac.ir*

Abstract

Talesh Mountains are the highest mountain range in the Western Caspian Sea. There are two Protected Areas in Talesh mountains, Lissar and Agh-dagh Protected Areas. The areas lies between Irano-Turanian and Euro-Siberian phytochorion, the vegetation were collected by 240 releves, focusing on altitudes between 2100 and 3300 m a.s.l., and following the traditional sampling strategy in the Braun-Blanquet approach. For classification of vegetation groups, the data matrix of species data was created. The matrix was subjected to a numerical classification using TWINSpan. In the most parts of the mountain, there are alpine and subalpine habitats, like snowbed, scree, Thorn-chushion. This study represents main dominant plant, main plant group and most endangered endemic plants for each habitats. Human activities such as over grassing, road building, harvesting medicinal and aromatic plants and also growth of villages and tourism have led to the destruction of the vegetation and habitats. Effective conservation initiatives are urgently required.

Keywords: conservation, IUCN, Aq-dagh, Lissar, Iran

Introduction

Environmental mosaics that determine the coexistence of different plant communities and promote high species richness are characterized high-elevation habitats (Korner, 2003; Bruun *et al.*, 2006). Altitude is an important factor in habitat diversity because it presents changes in the availability of resources, such as heat and water (Korner, 2000).

Protected Area defined as a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (Dudley 2008). There are some 104,791 of these protected areas, and they cover just over 12 % of the world's terrestrial surface (CHAPE *et al.*, 2005). In the Iran, during the forty-year documented protection history, 160 protected areas have been selected among the suitable lands of Iran, these areas comprise 7.17 % of the entire country area (Darvishsefat, 2007). Gathering data about the special habitats and their floristic composition of high altitude in the Tlesh protected area may help to for the conservation of these habitat and species, and these data will provide a baseline for monitoring changes in species diversity and distribution.

To date, only a few studies have been carried out to identify flora, phytosociology and vegetation to environmental variability in the sbalpine and alpine region within talesh mountains (Ghahremaninejad *et al.*, 2007; Akhlaghi *et al.*, 2012; Zazanashvili *et al.*, 2005). Ghahremaninejad *et al.* (2007) recorded 540 species in steppic part lissar protected area, Akhlaghi *et al.* 2012 listed 362 species from Aq-dagh protected Area. Zazanashvili *et al.*, (2005) determined zonal regions in high land Talesh Mountains.

The aim of this work is to establish the major vegetation types resulting from numerical classification and to reveal the major habitat and their composition of the vegetation, dominant and endangered plant in the high elevation Talesh Mountains.

Applied methods

A total of 240 releves were collected in the vegetation of the Talesh Mts, focusing on altitudes between 2100 and 3300 m a.s.l., and following the traditional sampling strategy in the Braun-Blanquet approach (Braun-Blanquet, 1964). All recorded vascular plants identified according to the Flora of Iran (Assadi, 1988–2011), FloraIranica (Rechinger, 1963–2010), Flora of

Turkey (Davis, 1965–1988), and Flora of Iraq (Townsend, 1966–1974). Endemic and endangered species have been indicated according to IUCN threat categories as used in the Red Data Book of Iran (Jalili & Jamzad, 1999) and biodiversity plant species of Iran (Ghahreman & Attar, 1999). For each plot were recorded elevation, geographic coordinate's aspect, slope inclination, as well as vegetation cover. A soil sample was taken also from the center of the quadrat to 30 cm depth.

Study area

The Talish Mountains forms the Northwest section of the Elburz Mts, extending southeast ward from the Azerbaijan border to the lower part of the Sefid-Rud in NW Iran. These are located in three rows and respectively are entered Hyrcanian phytochorion to Irano-Turanian region (Fig. 1). The Emberger precipitation-temperature coefficient (Q) for the research area is 113.58, assigning it as a highland climate. There are two protected areas in this Mountains, Lissar and Agh-dagh Protected areas:

Lissar protected area is located in the North Western parts of Talesh mountain range. This region has been established as protected area since 1969, with an area around 31000 hectares. The altitude of the area ranges between sea level to 3200 m and is influenced by humid Caspian climate at the Eastern slope and cold mountains of Irano-Turanian like climate at the Western slope causing formation of diverse vegetation.

Neor lake (with an area around 240 hectares) is located in West of the protected area at an altitude of approximately 2480 m and is surrounded by mountains such as Backrodagh and Hesarbolaghi. Backrodagh is the highest altitude in this area (3200 m). It includes the most of steppe parts topographical physiognomy. Our study area are comprise 11,000 hectares and is situated between 37° 55' and 38° 01' northern latitudes and 48° 42' and 48° 32' eastern longitudes.

The Agh-Dagh protected area is located around Sought Eastern parts of Talesh mountain range. Agh-Dagh is the only area that had been recorded as a legal protected area in the Ardabil province. The altitude of the area ranges between 500 m a.s.l. level to 3330 highest peak in the. The climate is markedly affected Hyrcanian and Irano-Turanian climates. Our study area are comprise 27,000 hectares and is situated between 37° 18' and 37° 30' northern latitudes and 48° 43' and 48° 29' eastern longitudes.

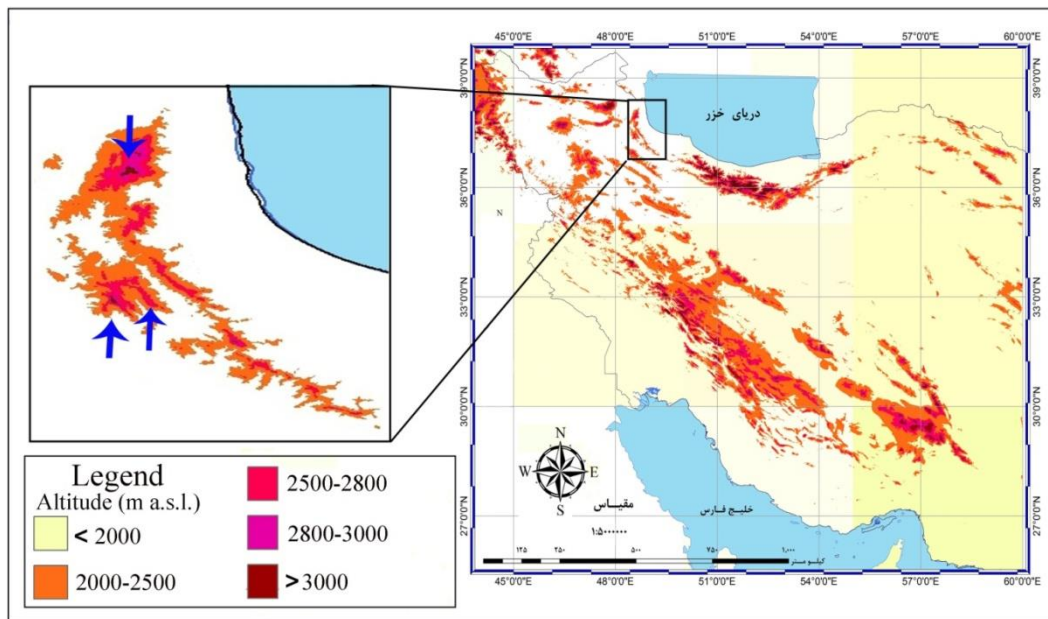


Fig. 1. Map of the study area and showing position of the area in Iran.

Result and Discussion

Flora

A total of 800 taxa of vascular plants have been identified from two Protected Area belonging to 70 families and 300 genera. The rich families of vascular plants are *Asteraceae*, *Poaceae*, *Brassicaceae*, *Fabaceae*, *Rosaceae*, *Caryophyllaceae*, *Lamiaceae*, *Scrophulariaceae*, *Boraginaceae*, *Apiaceae*, and *Ranunculaceae*.

Habitats

In the most parts of the mountain, there are alpine and subalpine habitats, like snowbed, scree, Thorn-chushion, wetland (Fig 2). Table 1 shows some ecological conditions for each habitat.

This study represents main dominant plant, main plant group and most endangered endemic plants for each habitats.

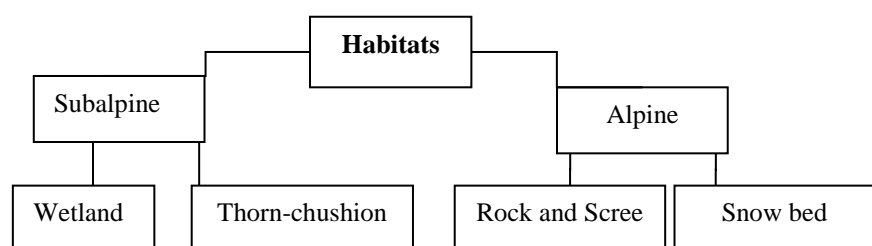


Fig 2. Habitats in two orobiome, Alpine and Subalpine.

Snowbed: In alpine landscapes snowbeds represent a singular habitat, mainly characterized by a short growing season determined by the snowmelt date, which has a strong influence on plant growth and phenology (Bell & Bliss, 1979) typical plants in this Habitat are *Aster alpines*, *Astragalus fragrans*, *A. lisaricus*, *A. pinetorum*, *Geum kokaniku*, *Corydalis persica*, *Colchicum kotschyi*, *Phleum alpinum*, *Iris reticulate*, *Plantago atrata*, *Sibbaldia parviflora*, *Veronica gentianoides*, *Pusckkinia Scilloides*, *Gagea dubia*, *Ranunculus bulbosus*, *Erodium dimorphum*, *Fritillaria kotschayana*, There are many other endemics and subendemics which urgently need protection because of habitat degradation or rarity in the area. Snowbeds are characterized by *Sibbaldia -potentilla* and *Geum-Astragalus* communities.

Wetlands: There are many wetlands in Lissar Protected area. Additionally, the Neor lake And their environment provide suitable habitats for aquatic flora. These habitats are present in the range 1800 to 3000 m.a.s.l. elevation. A low number of wetland occurs in the alpine and subalpine regions. Mountain wetland have been classified in two main categories: aquatic and telmatic wetlands, aquatic wetlands mainly consist of perennial hydrophytes or emergent plants (lakeside and riverside habitats). Telmatic wetlands are defined as wet, semi-terrestrial wetlands, and include three major types of wetland vegetation, i.e. springs, mires and wet meadows (Kamrani *et al.* 2011). In this study area, the mire habitats mainly dominated by species such as *Carex orbicularis*, *Trichophorum pumilum*, *Ranunculus amblyolobus*, *Triglochin maritima*, *Dactylorhiza umbrosa*, and wet meadow habitats dominated by species such as *Trifolium repens*, *T. pratense*, *Veronica gentianoides*, *Trisetum flavescens*, *Polygonum bistorta*. The spring habitat characterized by *Nasturtium officinale*, *Cardamine uliginosa*, *Mentha longifolia*, *Veronica beccabunga*. The lake habitats are composed by mainly of hydrophytic species such as *Butomus umbalatus*, *Eleocharis palustris*, *Schoenoplectus lacustris*, *Potamogeton nodusus* and *Polygonum amphibium*. The riversides are main habitats for the helophytic species such as *Heracleum persicum*, *Juncus inflexus*, *Ranunculus cicutarius* and *Circium echinus*.

Nearly Eight percent of the wetland taxa are endemic to Iran that includes 34 taxa. Occurring these endemic taxa indicates the special ecological and biogeographic importance of the area. Besides the endemics, Some of the taxa in the study area characterized as endangered species: *Allium kunthianum*, *Gentiana aquatica*, *Ornithogalum blansae*, *chmidtianum*, *Trisetum flavescens*, *Ventenata dubia*, *Filipendula ulmaria*, *Myosotis olymbica* subsp. *domavendica*, *Galium elbursense*.

Thorn-cushion:

the subalpine steppe dominated by thorn-cushion species are typical of Irano-Turanian plant formations. These formations cover stony and gravelly ground most part of Talesh mountains. They are covered by dominant thorny species

Table 1. The average value of some ecological conditions in study areas

Environmental Factors	Wetlands	Thorn-cushions	Snowbeds	Scree
Inclination	11	22	20	25
Vegetation	99	69	78	31
Ph	6.2	7.035579	6.459333	7.604483
EC	1019	867.7778	698.8667	931.7037
Organic Matter	5.66251	4.15107	5.466762	4.547186
sand	35	29.46939	30	31.28571
clay	28	32.71429	30.66667	28.71429
Silt	37	37.81633	39.33333	40

Onobrychidetea cornutae, *Acanthlimon hohenackeri*, *A. gilliatii*, *Astragalus microcephalus*, *A.paralipomenus*, *A. tragacantha*, *A. verus*, *Cirsium Haussknechtii*, *Cousinia urmiensis*, *Cruciata Laevipes*, and nonthorny cushion forms such as *Asyneuma pulchellum*, *Centaurea ovina*, *Ceratocephala testiculata*, *Dianthus orientalis*, *Dactylis glomerata*, *Erysimum caespitosum*, *Aethionema fimbriatum*, *Geranium persicum*, *Hypericum scabrum*, *Marrubium astracanicu*, *Minuartia juniperina*, *Phlomis olivieri*, *Silene ssp*, *Thymus kotschyanus*. These habitats host for some of the most endangered endemic plants such as *Minuartia aizoides*, *Astragalus pinetorum*, *Geranium montanum*. *Satureja isophylla*, *Scabiosa persica*, *Astragalus pinetorum*. Detailed description of this type of vegetation are given by (Klein, 1994) who described these communities under *Onobrychidetea cornutae* in the Alborz alpine regions.

Scree and rocks. The scree flora and vegetation is highly interesting in that they support many endemics species such as *Astragalus nezva-montis*, *A. khadem-kandicus*, *Arabis caucasica*, *Cicer incisum*, *Draba bruniiifolia*, *Jurinella moschus*, *Ducrosia anethifolia*, *Minuartia anatolica*, *Potentilla petraea*, *Physoptychis gnaphalode*, *Rosularia sempervivum*, *Scorzonera pseudolanata*, *Sedum spurium*, *S. subulatum*, *Sempervivum atropatanum*, *S. iranicum*, *Valeriana sisymbriifolia*, *Hedysarum persicum*. This habitats in the Talesh mountains are conversational hot spot, most of the plant represent this habitat endangered species. Two main plant group occur in talesh mountain scree habitate are, *Didymophyso aucheri-Dracocephaletea aucheri*, *Physoptychio gnaphalodis-Brometalia tomentosi*.

Conservation

Unfortunately, restoration ecology in Iran, is currently in a very primitive state and the protection strategies are often not based on modern concepts of ecosystem ecology (Akani et al. 2010). The growth of villages, over grazing, tourism and fire have all impacted negatively on the quantity and quality of the vegetation. The flora is changing with the local extinction of native medicinal and ornamental species through over collection. Conservation initiatives are urgently required.

In the Talesh high altitudes, a large number of species are traded for medicinal and aromatic uses. Many households in nomads and villagers on medicinal plant trade as a source of income this creates an increased need to focus on plant conservation in these areas, ensuring sustainable harvest as well as ecosystem sustainability. Some of the species more harvested include *Thymus ssp*, *Stachys lavandulifolia*, *Dracocephalum kotschyi*, *Ziziphora clinopodioides*, *Dactylorhiza umbrosa*, *Ornithogalum ssp*.

The overgrazing leads to the destruction of the vegetation, loss of biological diversity and erosion of soil. The dominance of thorn-cushion formation is obviously one of the consequences of long-term overgrazing and land use in Iranian plateau (Noroozi et al. 2008). The research area is exploited by local farmers for livestock grazing. This situation threatens the endemic plants and other plant species in the study area. This heavy grazing causes the populations of plant species to decrease. Some conservation measures should be taken and grazing in the Lissar protected area should be restricted. If this kind of overgrazing continues, some taxa, especially endemic species found in the vulnerable category, may face a very high risk of extinction in near future.

The environs of Neor lake and Subatan country are also exposed to the movement and picnicking activity of local people, especially on weekends and during holidays. Such activities bring about the destruction of flora due to the heavy usage of the area, causing environmental pollution.

Referece

Akani H., Djamali M, Ghorbanalizadeh A. & Ramezani E. (2010) Plant biodiversity oh Hyrcanian relict forests, N Iran: An over view of the flora, vegetation, Palaeoecology and conservation. *Pak. J. Bot.*, Special Issue 42: 231-258.

Akhlaghi A., Saeidi Mehrvarz Sh. & Naqinezhad A., (2012) Species Diversity of Palangan Habitat Flora of Aghdagh Protected Area (Ardabil province). *Journal of Applied Biology*, 25 (2): 56-85.

- Assadi, M. (ed.). (1987–2011) Flora of Iran. Vols 1–73. Research Institute of Forests and Rangelands of Iran, Tehran.
- Bell, K.L., Bliss, L.C. (1979) Autecology of *Kobresia bellardii*: why winter snow accumulation limits local distribution. *Ecol. Monogr.* 49, 377–402.
- Braun-Blanquet J. (1964) *Pflanzensoziologie. Grundzüge der Vegetationskunde*–Springer, Wien u.a., pp.865.
- Bruun H.H., Moen J., Virtanen R., Grytnes J.A., Oksanen L, Angerbjorn A. (2006) Effects of altitude and topography on species richness of vascular plants, bryophytes and lichens in alpine communities. *J Veg Sci* 17:37–46.
- Chape, S., Harrison, J., Spalding, M. & Lysenko, I. (2005). Measuring the extent and effectiveness of protected areas as an indicator for meeting global biodiversity targets. *Philosophical Transactions of The Royal Society* 360: 443-455.
- Davis, P.H. (ed.). (1965–1988). Flora of Turkey and east Aegean islands. Vols. 1–10. Edinburgh University Press. Edinburgh
- Dudley, N. (ed.) (2008) *Guidelines for Applying Protected Area Management Categories*. Gland, Switzerland: IUCN. x + 86pp.
- Darvishsefat Ali A. (2007) *Atlas of Protected Areas of Iran*. University of Tehran. Tehran, 170 pp.
- Ghahreman, A. & Attar, F. (1999) *Biodiversity of plant species in Iran*. vol. 1. Tehran University Press.
- Jalili, A. & Jamzad, Z. 1999. *Red Data Book of Iran*. Research Institute of Forests and Rangelands of Iran. Tehran.
- Kamrani, A., Naqinezhad, A., Attar, F., A., Jalili, & Charlet, D. (2011) Wetland flora and diversity of the Western Alborz Mountains, N. Iran. *Phytologia Balcanica*. **17** (1): p. 53 66.
- Korner C (2000) Why are there global gradients in species richness? Mountains might hold the answer. *Trends Ecol Evol* 15:513–4.
- Korner C (2003) *Alpine plant life: functional plant ecology of high mountain ecosystems*, 2nd edn. Springer, Berlin
- Noroozi, J., Akhiani, H. & Breckle, S.W. (2008). Biodiversity and phytogeography of the alpine flora of Iran. *Biodiversity and Conservation* 17: 493–521.
- Townsend, C.C., Guest, E. & Al-Rawi, A. (eds). (1966–1988). *Flora of Iraq*, 1–4, 8–9. Ministry of Agriculture, Republic of Iraq.
- Rechinger, K.H. (ed.). (1963–2010). *Flora Iranica*, 1–178, Akademische Druck-u, Verlags Austria. Graz.
- Zazanashvili, N., Gagnidze R. & Nakhutsrishvili G. (2005) Main types of vegetation zonation on the mountains of the Caucasus *Acta Phytogeogr. Suec.* 85: 7-16.
- Physical Distribution & Logistics Management. Vol. 42. No. 1. 8-35.