

Endemic and rare plant diversity of Ambarlik highland- case study from Çamlıhemşin, Türkiye

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Abstract: In this study, flora of Ambarlik plateau (Rize/Türkiye), rare and endemic taxa and their threat categories was investigated. During the study, 286 taxa and 152 genera belonging to 44 families were identified. Six of the identified taxa are from the Pteridophytes group and the remaining 280 taxa from the Spermatophyte group. The latter group includes two Gymnosperms and 278 Angiosperms. Out of the 278 taxa, 224 belong to Magnoliopsida and 54 to the Liliopsida classes. The endemism ratio of the taxa is around 9.09% and the threatened species is around 10.14%.

Key Words: Angiosperm, flora, Gymnosperm, species, threat categories

INTRODUCTION

There are a total of 11707 plant taxa in Turkey. Of these, 3649 taxa are endemics and the endemism rate is 31.82% [Güner, 2012]. The floristic diversity of Rize has been studied by many researchers notable among these being Vural [1996], Demir [2013], Atamov and Çobanoğlu [2019], Batan et al. [2018], Baykal, et al. [2018], Baykal and Atamov [2018]. Ekim et al. (2000) have published the “Red data Book of Turkish Plants” according to the “IUCN Red List Categories” version 2.3 prepared by the IUCN Species Survival Commission. In this book the status of endangered, rare and endemic plants have been evaluated according to the danger categories. Later, version 3.1 of IUCN Red List Categories was published in 2001. Accordingly, some changes were made by re-evaluating the danger categories of rare and endemic plants. In 2006, the General Directorate of Nature Conservation and National Parks initiated the “Capacity Building for Turkey in the Field of Environment (Twinning Established in the Scope of Nature Component) Project” and the Red List of Turkish Plants is being updated within the scope of this project [Akçiçek, Vural, 2007]. In the present study, version 3.1

2017-1 which is the most up-to-date version of IUCN Red List Categories was used.

MATERIAL AND METHODS

Ambarlik Plateau is connected to Çamlıhemşin district of Rize province. According to the grid system, it is situated in the A8 square, on the G45-B3 and G45-B4, 40° 50' 54" K - 40° 53' 06" D, 40° 48' 53" K - 40° 52' 15" D coordinates, 2400 - 3300 m altitudes. The location, satellite image and photographs of Ambarlik plateau are given below (Fig. 1).

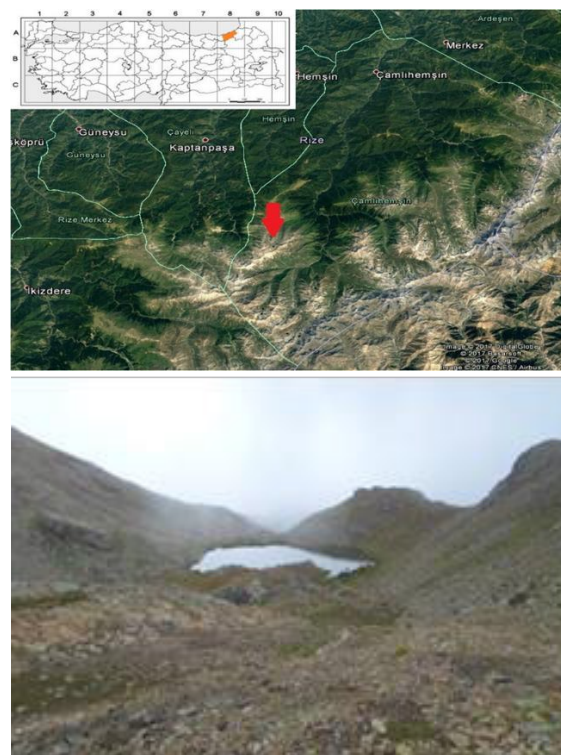


Figure 1. Location of the study area: satellite image of Ambarlik Plateau, a general view of the rocky and stony debris areas of a mountain lake and its surroundings in Ambarlik Plateau.

For floral studies regular field trips were carried out every 15 days between June and September during 2014 and 2016, and each field study lasted approximately three days. The plants were collected and photographed together with the necessary parts for identification,

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and their location and elevations were recorded with a Magellan Explorist 610 brand model GPS device. Pre-pressing was done in the field to avoid any damage to the collected plants. The pressed plant specimens were air dried, identified and deposited in the herbarium of the University (RTEUB).

The 11-volume of Flora of Turkey [Davis, 1965-1985; Davis et al., 1988; Güner et al., 2000] and the Flora of the Caucasus [Grossheim, 1939-1967] were used for plant identification.

Specimens with dubious identification were compared with those in Faculty of Forestry herbarium of Karadeniz Technical University (KATO), herbarium of Istanbul University Faculty of Pharmacy (ISTE) and herbarium of Istanbul University Faculty of Science (ISTF). For each specimens necessary information (taxonomic status, author, common names, locality, habitat type, altitude, date of collection, life form, geographical element type, danger category, if any, and endemism status) were provided.

The Turkish names of the plants are given according to the Turkey Plants List, Vascular Plants [Güner, 2012], and the danger categories are given according to the "IUCN Red List of Threatened Species" [URL-1].

RESULTS AND DISCUSSION

Based on the study of flora, 286 species were detected and 26 of which were determined as endemics, ratio of the endemism is 9.09%.

Plants in the study area were evaluated according to the IUCN Red List of Threatened Species ver.3.1 2017-1. The results revealed that 29 taxa in the study area are endangered, the rate of endangered taxa is 10.14%. The list of endangered plants is given in table 1, following the systematic position in the Flora of Turkey, together with family, taxa and danger categories.

The endemism ratios in the studies conducted in nearby areas were compared with the present study. The results are presented in table 2.

Table 1. Endangered taxa.

Family	Taxon	Danger Category
Cupressaceae	<i>Juniperus communis</i> subsp. <i>nana</i>	LC
	<i>Juniperus sabina</i> L.	LC
Brassicaceae	<i>Noccaea sintenisii</i> (Bornm.) F.K. Mey.	VU
Celastraceae	<i>Parnassia palustris</i> L.	LC
Fabaceae	<i>Trifolium pratense</i> L. var. <i>pratense</i>	LC
	<i>Trifolium canescens</i> Willd.	LC
Onagraceae	<i>Epilobium angustifolium</i> L.	LC
Apiaceae	<i>Chaerophyllum astrantiae</i> Boiss. & Ball.	NT
Valerianaceae	<i>Valeriana dioica</i> L.	LC
Asteraceae	<i>Cirsium trachylepis</i> Boiss.	VU
	<i>Centaurea appendicigera</i> C. Koch	EN
Primulaceae	<i>Primula auriculata</i> Lam.	LC
Gentianaceae	<i>Swertia iberica</i> Fischer	LC
Boraginaceae	<i>Myosotis sicula</i> Guss.	LC
Scrophulariaceae	<i>Veronica beccabunga</i> L. subsp: <i>beccabunga</i>	LC
Lamiaceae	<i>Prunella vulgaris</i> L.	LC
Plantaginaceae	<i>Plantago major</i> L. subsp. <i>major</i>	LC
Urticaceae	<i>Urtica dioica</i> L.	LC
Liliaceae	<i>Nartheicum balansae</i> Briq.	DD
Orchidaceae	<i>Orchis palustris</i> Jacq.	LC
	<i>Dactylorhiza euxina</i> (Nevski) H. Baumann var. <i>euxina</i>	NT
Juncaceae	<i>Juncus effusus</i> L.	LC
Cyperaceae	<i>Eleocharis uniglumis</i> (Link) Schultes	LC
	<i>Carex melanorrhyncha</i> Nelmes	DD
	<i>Carex umbrosa</i> Host subsp. <i>huetiana</i> (Boiss.) Soo	LC
	<i>Carex nigra</i> (L.) Reichard subsp. <i>alpina</i> (Gaudin) Lemke	LC
	<i>Carex nigra</i> (L.) Reichard subsp. <i>dacica</i> (Heuffel) Sooin Acta	LC
Poaceae	<i>Phleum alpinum</i> L.	LC
	<i>Festuca pontica</i> [E. Alexeev ex] Markgr.-Dannenb	EN

Note: DD (Data Deficient), EN (Endangered), LC (Least Concern), NT (Near Threatened), VU (Vulnerable).

Table 2. Comparison of endemism ratio in the study area with other studies (%).

Authors	Süzen, 2017	Güner, 1987	Terzioğlu, 1998	Eminağaoğlu, 2002	Çobanoğlu, 2012	Baykal, 2015
Endemism ratio	9.09	18.46	7	6.68	4.25	7

The studies undertaken in the localities close to our study area are shown below. S. Terzioğlu [1998] has recorded 1024 species and subspecies belonging to 117 families and 435 genera with 7% endemism rate, O. Eminağaoğlu [2002] has reported 853 taxa belonging to 92 families, 351 genera, 6.68% endemism, M. Çobanoğlu [2012] has mentioned 517 taxa, including 23 Pteridophytes, 10 Gymnosperms and 484 Angiosperms

belonging to 104 families and 352 genera, endemism ratio being 4.25 %, H. Baykal [2015] has mentioned 518 taxa belonging to 74 families and 260 genera with an endemism ratio of 7 %.

In the present study, 286 taxa belonging to 44 families and 152 genera have been recorded with a ratio of endemism around 9.09 %. The ratio reported by A. Güner et al. [1987] is twice the percentage recorded by us. The reason might be that the data published by A. Güner covers whole of Rize province. Our results coincides with those of other studies conducted in the above-mentioned nearby areas.

As conclusion, it was revealed that 29 taxa in the studies area are endangered. The numbers of endangered category include LC (Least Concern) for 21, NT (Nearly Threatened) for 2, VU (Vulnerable) for 2, EN (Endangered) for 2, DD (Data Deficient) for 2 species.

The rare species in both endemic and endangered categories are also encountered in the area. These species are *Noccaea sintenisii* (Bornm.) F.K. Mey. (Hasdaglarcik grass), *Cirsium trachylepis* Boiss.



Figure 2. Some rare plants for the study area: 1. *Saxifraga paniculata* Miller, Ambarlik plateau, Rocky habitat, 2300 m, 2. *Centaurea appendicigera* (C.Koch) Wagens, Ambarlik plateau, 3000 m, 3. *Corydalis alpestris* C. A. Meyer, Alpine, Ambarlik, 3200 m, 4. *Papaver lateritum* Koch, Ambarlik plateau, 2100 m, 5. *Festuca djimilensis* Boiss., Subalpine meadow, Ambarlik plateau, 2400-2600 m, 6. *Jurinella moschus* (Habl.) Bobrov subsp. *pinnatisecta* (Boiss.) Danin Et Davis, alpine meadow, Ambarlik plateau, 2800 m.

(Rough boiler handle), *Centaurea appendicigera* C. Koch (Ovit Tülübaş), *Festuca pontica* [E. Alexeev ex] Markgr.-Dannenb (Rockball) is *Carex melanorrhyncha* Nelmes (*Pristine footgrass*). Some of these taxa are given in the figure 2.

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Ambarlık yaylasının endemik və nadir bitki müxtəlifliyi Çamlıhemşin, Türkiyə nümunəsində

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Bu tədqiqatda Ambarlık yaylasının (Rize/Türkiyə) florası, nadir və endemik taksonları və təhlükə kateqoriyaları araşdırılmışdır. Tədqiqat zamanı 44 fəsilə və 152 cinsə aid 286 takson müəyyən edilmişdir. Təyin edilmiş taksonlardan altısı Pteridophyte qrupuna, qalan 280 takson isə Spermatophyte qrupuna aiddir. Sonuncu qrupa iki çılpaqtoxumlu və 278 örtülütoxumlu bitki növü daxildir. 278 taksondan 224-ü Magnoliopsida,

54-ü isə Liliopsida siniflərinə aiddir. Taksonların endemizm nisbəti 9.09%, nəslə kəsilməkdə olan növlər isə 10.14% təşkil edir.

Açar sözlər: *Angiosperm, flora, Gymnosperm, növ, təhlükə kateqoriyaları*

Разнообразие эндемичных и редких растений Амбарликского нагорья на примере Чамлихемшин, Турция

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В этом исследовании изучалась флора плато Амбарлык (Ризе/Турция), редкие и эндемичные таксоны и уровень угрозы влияющий на них. В ходе исследования выявлено 286 таксонов и 152 рода, относящихся к 44 семействам. Шесть из идентифицированных таксонов относятся к группе Pteridophytes, а остальные 280 таксонов относятся к группе Spermatophyte. Последняя группа включает два вида Gymnospermae и 278 Angiospermae. Из 278 таксонов 224 принадлежат к классам Magnoliopsida и 54 к классам Liliopsida. Коэффициент эндемизма таксонов составляет около 9.09%, а видов, находящихся под угрозой исчезновения, около 10.14%.

Ключевые слова: *Angiospermae, флора, Gymnospermae, виды, уровень угроз*