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Classification of Endemic Plants and Priority Conservation Areas in Küre Mountains National Park (Kastamonu Section)*

Küre Dağları Milli Parkının (Kastamonu Bölümü) Endemik Bitkileri ve Öncelikli Koruma Alanlarının Sınıflandırılması

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Abstract

Kastamonu section of Küre Mountains National Park has extraordinary biologic plant diversity. Especially karstic rocky areas and canyons on the forest belt have endemic richness. This study was conducted in Küre Mountains National Park which has the distribution of about 1000 taxa, and it was determined 40 endemic taxa during this study. By taking into consideration of the number of endemic plants, population density and threat factors, the priority conservation areas in the National Park are divided into two subclasses. First level important areas: Horma Canyon, Ilıca Waterfall, Valla Canyon; second level important areas: Çatak Canyon, Armutluçayırı, Kokurdan Alm and Loc Valley. This classification will be a guide for the recreational activities in the future by revealing the habitats of endemic plants and their spread. This study also shows the IUCN criteria, population density and conservation suggestions for the endemic plants spread in the area.

Keywords: Conservation, Endemic, Küre Mountains, Kastamonu

Özet

Küre Dağları Milli Parkının Kastamonu bölümü Türkiye'nin ender bitkisel biyolojik çeşitliliğe sahip alanlarından birisidir. Milli Parkın orman kuşağı üzerindeki karstik kayalık alanları ve kanyonları endemik bitkiler açısından oldukça zengindir. Yaklaşık 1000 bitki taksonunun yayılış yaptığı Küre Dağları Milli Parkının Kastamonu bölümünde yapılan bu çalışmada 40 endemik bitki taksonu tespit edilmiştir. Bu çalışmada, Milli Park sınırları içerisinde öncelikli korunması gereken alanlar; alandaki endemik taksonların sayısı, populasyon yoğunlukları ve tehdit unsurları dikkate alınarak 2 alt sınıfa ayrılmıştır. I. Derece Önemli Alanlar: Horma Kanyonu, Ilıca Şelalesi ve Valla Kanyonu; II. Derece Önemli Alanlar: Çatak Kanyonu, Armutluçayırı, Kokurdan Yayla ve Loç Vadisi olarak önerilmektedir. Bu sınıflandırmanın, Milli Parkın Kastamonu bölümünde yapılmış ve yapılacak olan rekreasyon çalışmalarının planlanmasında endemik taksonların habitatları ve yayılış alanları göz önünde bulundurularak yapılması açısından bir altlık oluşturacağı düşünülmektedir.

Ayrıca bu çalışmada alanda yayılış gösteren endemik taksonların IUCN kriterleri, habitatları, popülasyon sıklıkları ve koruma önerileri verilmiştir.

Anahtar Kelimeler: Endemik, Koruma, Küre Dağları, Kastamonu

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1. Introduction

Turkey has a rich endemic plant diversity with its elevation changing between 0 and 5000 m, its location in which it is seen the effects of three different plants geography, its surface features, its geological and morphological diversity and with its aquatic richness in different environments such as seas, lakes and rivers. Turkish flora has 11707 taxa and 3649 of these taxa are endemic, so the endemism rate is %31.82 (Güner et al., 2012). Especially Mediterranean Flora region is the richest phytogeographic flora region with regard to endemic plants, Irano-Turanian Flora region comes the second and Euro-Siberian Flora region follows them. The factors that determine the endemic taxa number change according to how old is this area geologically, topographic characteristics, insulation test and process. Turkey by its location and the zone that it takes place is one of the richest countries in the world in terms of endemic plants diversity (Ekim et al., 2000; Erik and Tarikahya, 2004; Vural, 2009).

The study area covers Kastamonu section of Küre Mountains. Küre Mountains start from Bartın River on the west and extends to Kızılırmak River in the east. Küre Mountains National Park is 37.753 ha, whereas our research area is 18.000 ha (Kastamonu section).

According to Davis's grid system, research area is in A4 square and both Euro-Siberian, Irano-Turanian and Mediterranean Floras influence are seen the in the region. The National Park was identified as one of the 100 Forest Hot Spots of Europe which should be protected. Also, the area is one of the 9 Forest Hot Spots and 311 Key Biodiversity Areas in Turkey that must be protected (Blumer, 2010). The field survey was carried out in March and September, between 2018-2020 years.

Kastamonu Section of Küre Mountains National Park is one of the significant areas in Turkey in terms of endemic plants. It has been conducted a lot of flora and vegetation studies in Kastamonu and its neighborhood up until today. With these studies, 250 endemic plant taxa were determined (Demirbaş et al., 2013; Güney et al., 2015; Güney, 2005; Özbek, 2004; Pehlivan, 2007; Tekdemir, 2003; Tunçkol and Aksoy, 2018; Tuttu et al., 2019; Uzunoğlu, 2004). Also, in recent years, a number of new taxa and records were added to Turkish flora with the studies conducted in the borders of Küre Mountains National Park (Tunçkol et al., 2020a; Tunçkol et al., 2020b; Tunçkol et al., 2020c).

This study reveals the importance of regional flora studies because with this study 10 endemic plants which were not recorded before were added to list of endemic plants of Kastamonu. In this study, priority conservation areas in National Park are classified by

taking into consideration of the number of endemic plants, population density and threat factors. Also, the IUCN categories of endemic plants, their threat categories, their habitats in the area, their blooming period, their abundance and threatened are explained.

2. Material and Method

Research field is located in an area in which it is seen the effects of Euro-Siberian, Irano-Turanian and Mediterranean Flora Regions. It is in between 41 55' 50"-33 04' 33" north latitudes and 41 44' 42"-34 15' 50" east longitudes (Figure 1). The research area is 18000 ha size and it is between 0 and 1450 m heights.

Figure 1. Research area and conservation areas of Küre Mountains National Park (Kastamonu) with respect to endemic plants (Google Earth, 1/25000)

The names of the endemic and rare taxa determined in the area and their threat categories are arranged according to IUCN categories, The Red Book of Turkish Plants, and

the Version 3.1 published by IUCN in 2001 (Ekim et al., 2000). In the study it is benefited from the works of the Flora of Turkey and the East Aegean Islands and systematic order for the subdivision systematic of the angiosperm (Cole et al., 2016; Davis et al., 1965-1988; Güner et al., 2000), (APG IV). Firstly, the identified endemic taxa for the Kastamonu in A4 square were found out by comparing them with the following studies (Boisser, 1867-1888; Davis et al., 1965-1988; Demirbaş et al., 2013; Güney, 2005; Güney et al., 2015; Özbek, 2004; Özhatay et al., 1994; Özhatay et al., 1999; Özhatay and Kültür, 2006; Özhatay et al., 2011; Pehlivan, 2007; Tekdemir, 2003; Tunçkol and Aksoy, 2018; Tuttu et al., 2019; Uzunoğlu, 2004).

3. Results and Discussion

In this study, the priority conservation areas in the National Park are divided into two subclasses by taking into consideration of the number of endemic plants, population density and threat factors (Table 1).

I. 1st level important areas: Horma Canyon, Ilıca Waterfall, Valla Canyon;

II. 2nd level important areas: Çatak Canyon, Armutluçayırı, Kokurdan Alm, and Loc Valley.

The abbreviations used in the text and the floristic list are as follows; About IUCN risk categories: CR: Critically Endangered; EN: Endangered; LC: Least Concern; VU: Vulnerable; The other abbreviations: E.: East; IUCN: International Union for the Conservation of Nature and Natural Resources; m: meter; mt.: mountain; subsp.: subspecies; var.: variety. And, also it has been given by habitat types according to IUCN Habitat Classification (Scheme, 2020).

Table 1. Villages The names and threat categories of endemic and rare taxa

FAMILY	TAXA	IUCN	ELEMENT	PLANT LIFE	FORM	HABITAT	ALTITUDE (m)	FLORESCENCE (MOUNTH)	POPULATION FREQUENCY
Dryopteridaceae	*Polystichum asiae-minoris* Tunçkol & Li Bing Zhang	CR	Euro-Siberian	Perennial	Herbaceous	Shady rock	600	-	Rare
Pinaceae	*Abies nordmanniana* subsp. *equi-trojani* (Asc. & Sint. ex Boiss.) Coode & Cullen	LC	Euro-Siberian	Perennial	Tree	Forests	500	-	Common
Araceae	*Arum hygrophilum* subsp. *euxinum* (R.R.Mill) Alpınar	LC	Euro-Siberian	Perennial	Herbaceous	Wet meadow	700	4	Medium

Iridaceae	*Crocus biflorus* subsp. *pulchricolor* (Herb.) B.Mathew	LC	Euro-Siberian	Perennial	Herbaceous	Wet meadow	1000	3	Rare
Iridaceae	*Crocus ancyrensis* (Herb.) Maw	LC	Irano-Turanian	Perennial	Herbaceous	Forest Riperian Zone & Meadow	650	3	Medium
Papaveraceae	*Corydalis wendelboi* subsp. *congesta* Lidén & Zetterl.	EN	-	Perennial	Herbaceous	Forest Riperian Zone & Meadow	900	5	Low
Rosaceae	*Crataegus tanacetifolia* (Poir.) Pers.	LC	-	Perennial	Scrub	Rocky slope and meadow	120000	6	Low
Celastraceae	*Euonymus latifolius* subsp. *cauconis* Coode & Cullen	LC	Euro-Siberian	Perennial	Scrub	Understory of Wet Forest	800	5	Low
Linaceae	*Linum flavum* subsp. *scabrinerve* (P.H.Davis) P.H.Davis	LC	Irano-Turanian	Perennial	Herbaceous	Forest Riperian Zone	500	6	Low
Brassicaceae	*Barbarea trichopoda* Hausskn. ex Bornm.	LC	Mediterranean	Perennial	Herbaceous	Roadside, meadow	1100	4	Low
Caryophyllaceae	*Dianthus carmelitarum* Reut. ex Boiss.	LC	Euro-Siberian	Perennial	Herbaceous	Roadside, meadow	700	6	Low
Caryophyllaceae	*Dianthus kastembeluensis* Freyn & Sint.	LC	Euro-Siberian	Perennial	Herbaceous	Limestone rock	600	7	Medium
Caryophyllaceae	*Dianthus leucophaeus* Sm.	LC	-	Perennial	Herbaceous	Meadow	1200	8	Low
Caryophyllaceae	*Minuartia gracilis* McNeill	VU	Euro-Siberian	Perennial	Herbaceous	Limestone rock	900	5	Medium
Rubiaceae	*Asperula pestalozzae* Boiss.	LC	Euro-Siberian	Perennial	Subscrub	Limestone rock	600	7	Low
Boraginaceae	*Onosma paphlagonica* Bornm.	VU	Euro-Siberian	Perennial	Herbaceous	Limestone rock	550	6	Low

Boraginaceae	*Paracaryum paphlagonicum* (Bornm.) R.R.Mill	LC	Irano-Turanian	Biennial	Herbaceous	Limestone rock	600	5	Low
Plantaginaceae	*Digitalis lamarckii* Ivanina	LC	Irano-Turanian	Perennial	Herbaceous	Forest Riperian Zone & Rocky Area	500	7	Medium
Plantaginaceae	*Linaria corifolia* Desf.	LC	Irano-Turanian	Perennial	Herbaceous	Limestone rock	650	5	Low
Scrophulariaceae	*Verbascum abieticola* Bornm.	LC	Euro-Siberian	Biennial	Herbaceous	Forest Riperian Zone	1000	7	Low
Scrophulariaceae	*Verbascum spectabile* var. *isandrum* Hub.-Mor.	EN	Euro-Siberian	Biennial	Herbaceous	Forest Riperian Zone	900	8	Low
Lamiaceae	*Sideritis dichotoma* Huter	LC	-	Perennial	Herbaceous	Limestone rock	1100	7	Rare
Lamiaceae	*Phlomis russeliana* (Sims.) Lag. ex Benth.	LC	Euro-Siberian	Perennial	Herbaceous	Forest Riperian Zone	800	5	Medium
Lamiaceae	*Sideritis germanicopolitana* subsp. *viridis* Hausskn. ex Bornm.	LC	Euro-Siberian	Perennial	Herbaceous	Limestone rock	650	7	Low
Orobanchaceae	*Melampyrum arvense* var. *elatius* Boiss.	LC	Euro-Siberian	Annual	Herbaceous	Forest Riperian Zone	600	5	Low
Orobanchaceae	*Orobanche turcica* G.Zare & Dönmez	VU	-	Perennial	Herbaceous	Limestone rock	660	6	Rare
Campanulaceae	*Asyneuma limoniifolium* subsp. *pestalozzae* (Boiss.) Damboldt	LC	-	Perennial	Herbaceous	Limestone rock	1050	6	Medium
Campanulaceae	*Campanula grandis* subsp. *grandis* Fisch. & C.A.Mey.	LC	Euro-Siberian	Perennial	Herbaceous	Moist forest side, meadow	500	7	Medium
Campanulaceae	*Campanula pterocaula* Hausskn.	LC	Euro-Siberian	Biennial	Herbaceous	Limestone rock	1150	6	Low

Asteraceae	*Centaurea cadmea* subsp. *pontica* Köse & Ocak	LC	-	Perennial	Herbaceous	Limestone rock	800	6	Medium
Asteraceae	*Iranecio hypochionaeus* (Boiss.) C.Jeffrey	LC	-	Perennial	Herbaceous	Rocky slope	50	7	Low
Asteraceae	*Hieracium paphlagonicum* Freyn & Sint.	LC	-	Perennial	Herbaceous	Limestone rock	680	7	Low
Asteraceae	*Inula helenium* subsp. *orgyalis* (Boiss.) Grierson	LC	Euro-Siberian	Perennial	Herbaceous	Wet Meadow	1050	7	Medium
Asteraceae	*Tripleurospermum rosellum* var. *album* E.Hossain	VU	-	Perennial	Herbaceous	Limestone rock	80	6	Low
Caprifoliaceae	*Cephalaria paphlagonica* Bobrov	LC	-	Perennial	Herbaceous	Limestone rock	50	7	Low
Apiaceae	*Astrantia maxima* subsp. *haradjianii* (Grintz.) Rech.f.	LC	-	Perennial	Herbaceous	Forest riparian Zone	800	6	Low
Apiaceae	*Ferulago platycarpa* Boiss. & Bal.	LC	Irano-Turanian	Perennial	Herbaceous	Open Areas in Forest, Shurbs	750	6	Low
Apiaceae	*Olymposciadium caespitosum* (Sm.) Wolff	LC	-	Perennial	Herbaceous	Rocky Area	630	7	Rare
Apiaceae	*Peucedanum graminifolium* Boiss.	EN	-	Perennial	Herbaceous	Grassland	800	7	Low
Apiaceae	*Seseli resinosum* Freyn & Sint.	VU	Euro-Siberian	Perennial	Herbaceous	Limestone rock	600	6	Medium

As a result of the field studies in Kastamonu Section of Küre Mountains National Park, 40 endemic taxa belong to 34 genus and 20 family were determined. As the research field is on the transition area of Euro- Siberian and Irano-Turanian Flora regions, distribution of endemic plants are affected from these two regions. However, Euro-Siberian region is represented with more endemic taxa (Table 2)

Table 2. The numbers of endemic plants according to threat categories

Threat Category	The number of taxa
CR	1
EN	3
VU	5
LC	31

In recent studies conducted in Küre Mountains National Park, it was discovered 2 new species for the world. One of them was *Polystichum asiae-minoris* Tunçkol & Li Bing Zhang and it was discovered in the Kastamonu section of the National Park (Tunçkol et al., 2020b). The endemic and new species determined during the continuing flora studies in the area reveals that for the species in CR, EN and VU categories In-situ and Ex-situ measures should be taken. In addition to that, the areas in which there are Horma Canyon, Ilıca Waterfall and Valla Canyon are among the 1st degree protection areas because of their increasing popularity and tourism activities recently. Çatak Canyon, Armutluçayı, Kokurdan Alm and Loc Valley are 2nd degree protection areas.

Because of the new walking trail in the area in which the new species *Polystichum asiae-minoris* for the world was found, its CR level population is in the more dangerous status. So, in the area it is very significant to prevent the activities that harm the plants and their natural habitats. Especially first for *Polystichum asiae-minoris* and the other plants in CR and EN categories, species action plans for the conservation status of the plants should be released. It should not be allowed visitors to collect plants, and the warning signs should be placed on the walking trail (Figure 2).

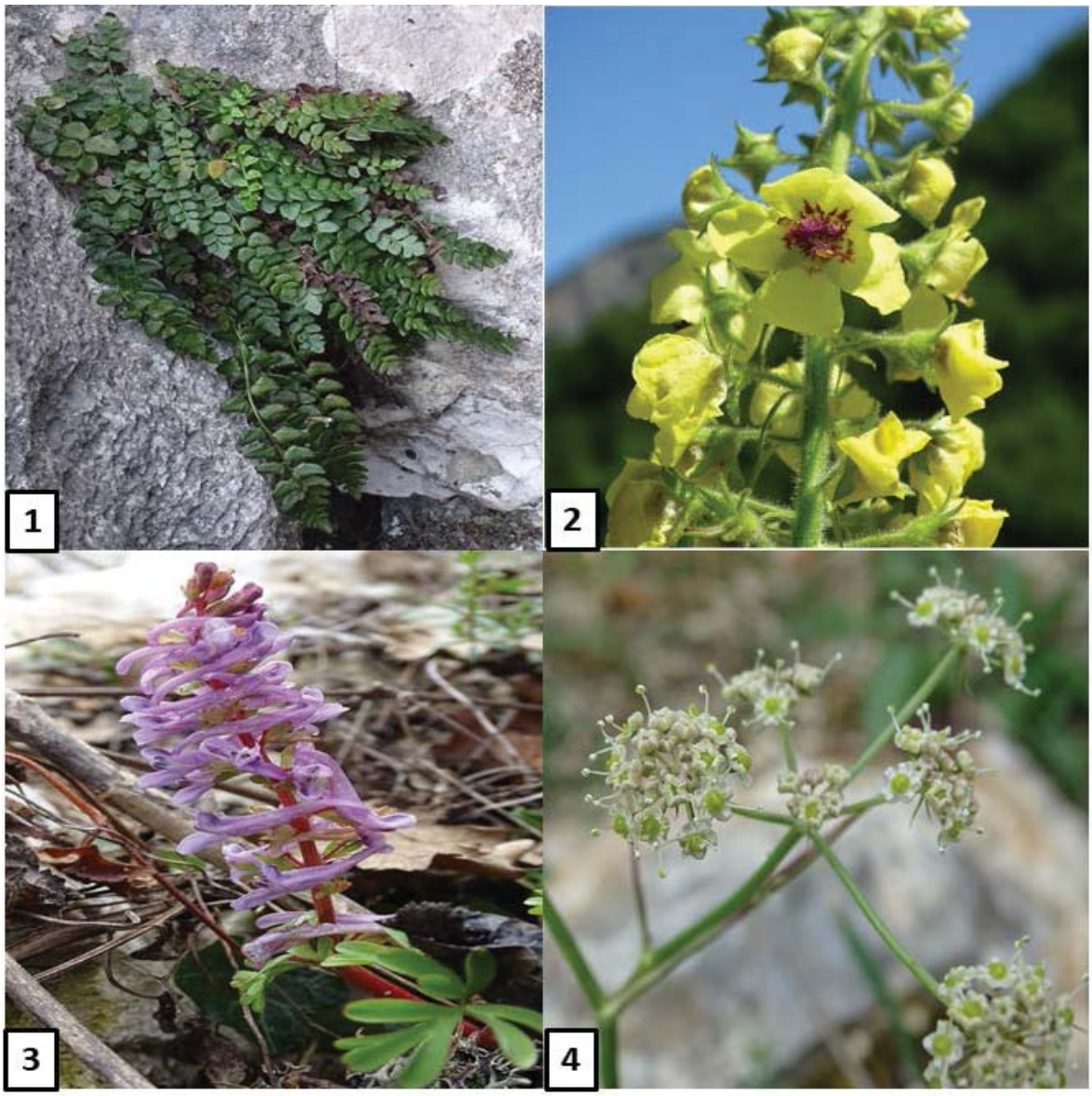

Figure 2. Extinction risk of endemic plant taxa and their habitats on Kastamonu Section of Küre Mountains National Park; 1. *P. asiae-minoris* 2. *V. spectabile* var. *isandrum* 3. *C. wendelboi* subsp. *congesta* 4. *P. graminifolium*.

Besides, some measures should be taken against the land abuse, road building, marble quarries and mines, afforestation activities contrary to natural vegetation (especially planting exotic trees such as arborvitae, acacia, blue cypress, and tree of heaven), commercial collection of plants (especially *Orchis* species) and bio smuggling. In this sense, biogenetic reserve should be provided and habitat and biotope areas of endemic plants should be defined. An active administration which is preventive and which accelerates the bureaucracy should be constituted. Conservation status should be provided.

4. Results

Although it is an endemic plant in The Flora of Turkey *Cephalaria paphlagonica* was presented as a new record in the study named A New Record of *Cephalaria paphlagonica* Bobrov (Dipsacaceae) for the Iraqi Flora (Sardar, 2014). When it is considered this endemic plant's local distribution in Turkey, it is thought that it is not possible for this plant to be there. Also, in the study named A new species of Orobanche (Orobanchaceae) from Turkey, *Orobanche turcica* taxa was determined as a new species for the world and was included in the endemic list and so it has added the list above (Zare and Dönmez, 2014). This species were collected from on *Onosma paphlagonica* taxa that has endemic distribution in the area. Also *Anthemis cretica* subsp. *albida* (Boiss.) Grierson and *Anthemis cretica* subsp. *pontica* (Willd.) Grierson whose type species are known as Turkey, are not added to endemic list since there is not enough information about these taxa.

Astragalus bartinense is described as a new species from Bartın Province of Küre Mountains, by Tunçkol, et al., 2020a. But, it can probably be discovered in the different regions of Kastamonu Section of Küre Mountains and closed surrounding areas of Euro-Siberian flora regions of Turkey with extensive field studies.

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References

Blumer, A. (2010). WWF. *Sürdürülebilir Turizm Gelişim Stratejisi (KDMP)*, Rapor, WWF-Türkiye.

Boisser, E. (1867-1888). *Flora Orientalis*. Volume: 1-5, Suplement by Buser, R. Geneve, Switzerland.

Cole, TCH., Hilger, HH., & Doğru Koca, A. (2016). *Kapalı Tohumluların Filogenisi - Çiçekli Bitkiler Sistematiği*. Freie Üniversitesi Berlin, ,DOI: 10.13140 / RG.2.1.4533.7203.

Davis, P. H. (1965-1988). *Flora of Turkey and East Aegean Islands vol. 1-9*. Edinburg University Press, Edinburgh.

Davis, P. H., Mill, R.R. & Tan, K. (1988). *Flora of Turkey and East Aegean Islands vol. 10 (suppl. 1)*.Edinburg University Press, Edinburgh.

Demirbaş, Ö. M., Özbek, U., & Vural, M. (2013). Flora of Armutlucayir (Kastamonu/Turkey). *Biological Diversity and Conservation (Biodicon)*, 6/1, 22-31.

Ekim, T., Koyuncu, M., Vural, M., & Adıgüzel, N. (2000). *Türkiye Bitkileri Kırmızı Kitabı, Eğrelti ve Tohumlu Bitkiler (Red Data Book of Turkish Plants. Pteridophyta and Spermatophyta)*. Barışçan Ofset, 246 s., Ankara.

Erik, S., & Tarıkahya, B. (2004). Türkiye florası üzerine. *Kebikeç*, 17, 139–163.

Güner, A., Özhatay, N., Ekim, T., & Başer, K.H.C. (2000). *Flora of Turkey and East Aegean Islands*, *vol. 11 (suppl. 2)*. Edinburgh University Press, Edinburgh.

Guner, A. (2012). *Turkey Plant List (Vascular Plants) (Türkiye Bitkileri Listesi (Damarlı Bitkiler))*. Türkiye Flora Araştırmaları Derneği, Nezahat Gökyiğit Botanik Bahçesi Yayınları, Flora Dizisi 1, Birinci Basım.

Güney, K.B. (2005). *Ballıdağ Florası (Kastamonu/Daday)*. Master of Science Thesis, Graduate School of Natural and Applied Sciences at Gazi University, Ankara.

Güney, K., Yigit, N., Seki, N., Ozturk, A., & Akturk, E. (2015). Assessment of Endemic Plant Taxa in Kastamonu Province and Classification By IUCN Categories. *IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)*, Volume 9, Issue 12 Ver. II, PP 79-99. DOI: 10.9790/2402-091227999

IUCN. *Red List Categories*. (2001). Version 3.1. Prepared by the IUCN Species Survial Commission. IUCN, Gland Switzerland and Cambridge, UK.

IUCN. *Habitats Classification Scheme*. (2020). Version 3.1. Prepared by the The IUCN Red List of Threatened Species. Version 2020-2.https://www.iucnredlist.org.ISSN 2307-8235.

Özbek, M. U. (2004). *Kurt Girmez Dağı ve Çatak Kanyanu Florası (Küre Dağları Kastamonu)*. Master of Science Thesis, Graduate School of Natural and Applied Sciences at Gazi University, Ankara.

Özhatay, N., Kültür, Ş., & Aksoy, Ş. (1994). Chek-List of Additional Taxa to the Supplement Flora of Turkey. *Turkish Journal of Botany*, 18(6), 497-514.

Özhatay, N., Kültür, Ş., & Aksoy, Ş. (1999). Chek-List of Additional Taxa to the Supplement Flora of Turkey. *Turkish Journal of Botany*, 23(3),151-169.

Özhatay, N. & Kültür, S. (2006). Check-list of additional taxa to the supplement Flora of Turkey III. *Turkish Journal of Botany*, 30, 281-316.

Özhatay, N., Kültür, S., & Gürdal, M. (2011). Check-list pf additional taxa to the supplement Flora of Turkey V. *Turkish Journal of Botany*, 35, 1-36.

Pehlivan, G. (2007). *Ilgaz Dağı Milli Parkı Florası*. Master of Science Thesis, Graduate School of Natural and Applied Sciences at Gazi University, Ankara.

Sardar, A. Sh. (2014). A new record of Cephalaria paphlagonica Bobrov (Dipsacaceae) for the Iraqi Flora. *JJBS, Jordan Journal of Biological Sciences*, 7 (4), 293-297.

Tekdemir, R. (2003). *Ilgaz Dağı Büyük Hacet Tepesinin Alpin Florası*. Master of Science Thesis, Graduate School of Natural and Applied Sciences at Gazi University, Ankara.

Tunçkol, B., & Aksoy, N. (2018). Flora of Küre Mountains National Park (Bartın Section). *Journal of Forestry*, 14(2): 80-113.

Tunçkol, B., Aytaç, Z., Aksoy, N., & Fişne, A. (2020a). Astragalus bartinense (Fabaceae), a new species from Turkey. *Acta Botanica Croatica*, 79(2): 131-136.

Tunçkol, B., Yaşayacak, H., Liang, Z., Aksoy, N., & Zhang, L. (2020b). Polystichum asiae-minoris (Dryopteridaceae), a new fern from Kastamonu, Turkey. *Phytotaxa*. 447, 296-300. 10.11646/phytotaxa.447.4.8.

Tunçkol, B., Yaşayacak, H., & Aksoy, N. (2020c). Distribution patterns of rare Kitaibela vitifolia Willd in Turkey: Taxonomy, chorology, and conservation. ISSN 2226-3063 e-ISSN 2227-9555, *Modern Phytomorphology*, 14, 1–3.

Tuttu, G., Abay, G., & Yıldırımlı, Ş. (2019). Tosya (Kastamonu) İlçesinin Endemik ve Nadir Bitkileri. *Journal of Anatolian Environmental and Animal Sciences*, 4 (1), 48-52. DOI: 10.35229/jaes.535559.

Uzunoğlu, Y. (2004). *Ilgaz Dağının Küçük Hacet Tepesinin Alpin Florası*. Master of Science Thesis, Graduate School of Natural and Applied Sciences at Gazi University, Ankara.

Vural, M. (2009). Biyoçeşitlilik Sözleşmesi ve Türkiye'nin Floristik Yapısı. *Bağbahçe Dergisi*, 24, 8-9.

Zare, G., & Dönmez, A. (2014). A new species of Orobanche (Orobanchaceae) from Turkey *Phytotaxa* 184 (3), 148–154. doi.org/10.11646/phytotaxa.184.3.4.