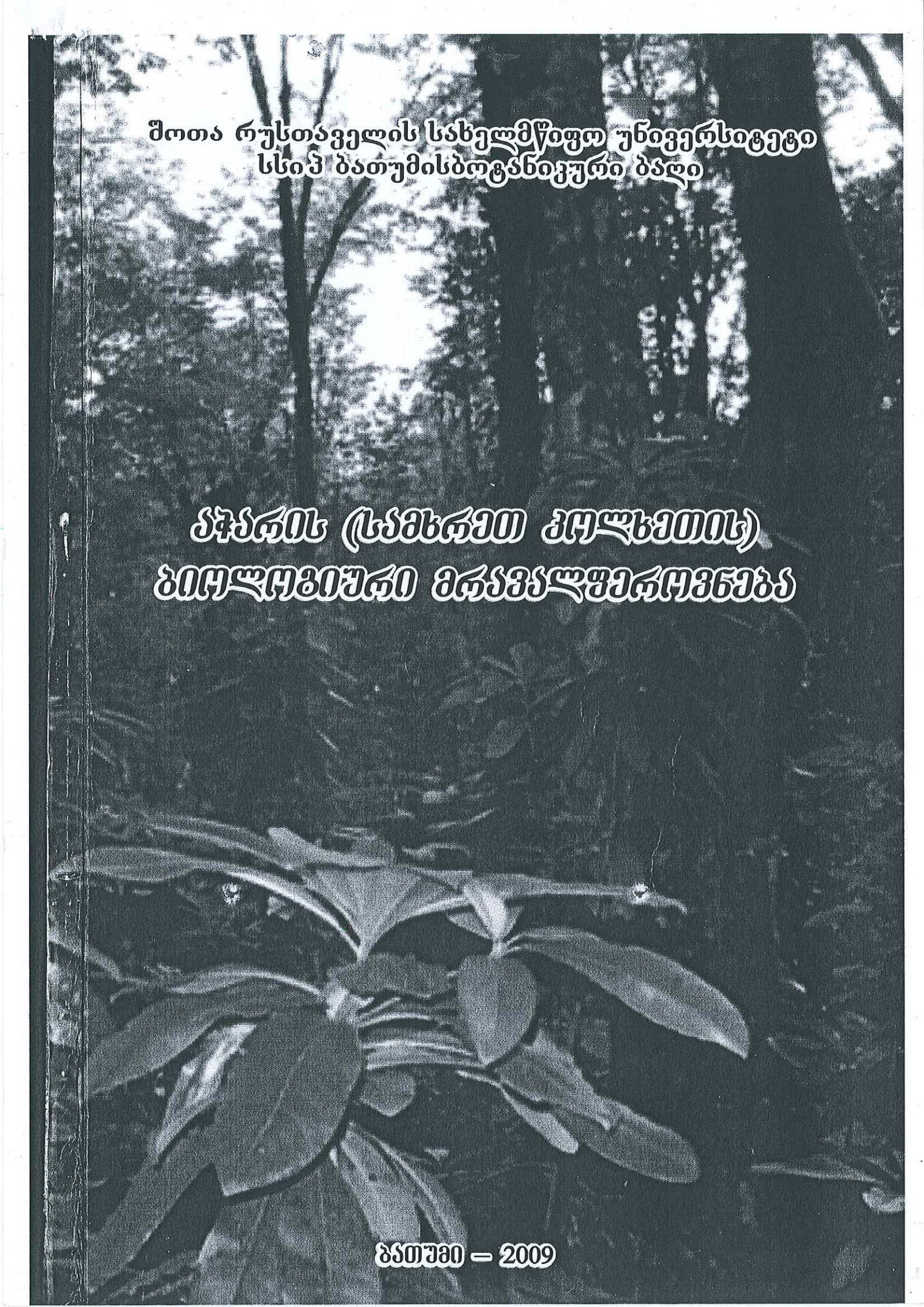




შოთა რუსთაველის სახელმწიფო უნივერსიტეტი
სსიპ ბათუმისბოტანიკური ბაღი

აჭარის (სამხრეთ კოლხეთის)
ბიოლოგიური მრავალფეროვნება

ბათუმი – 2009

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Shota Rustaveli State University
Batumi Botanical Garden

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ბიოლოგიური მრავალფეროვნება

THE BIOLOGICAL DIVERSITY OF
ADJARA (SOUTH COLCHIC)

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DENDROFLORA OF ARTVIN
ARTVIN ÇORUH UNIVERSITY, FACULTY OF
FORESTRY, 08000, ARTVIN-TURKEY

INTRODUCTION. Turkey has 75% of the number of plant species that occur in the whole of Europe. One third of Turkish flora, which is more than twice as diverse as those of neighboring countries, is found only in Turkey. The country has several distinct biogeographically regions, each with its own endemic species and natural ecosystems. These include Caucasian mountain mixed temperate rain forests and alpine ecosystems of the North East Black Sea Coast; steppe grasslands of the Central Anatolian plateau; and the European and the Mediterranean regions, which, respectively, include probably the largest remaining stands of pristine alluvial forests.

Artvin is located in the northeastern side of the Anatolia, bordering with Georgia to the north, lies within the Colchic sector of the Euro-Siberian floristic area in the Holarctic region and is situated in the A8-A9 squares according to Davis's grid system [1].

Artvin includes Camili Biosphere Reserve, known as the first biosphere site of Turkey, is one of the 507 sites in 102 countries worldwide. Artvin has one of the cradles of much younger postglacial forests of Central Europe and one of the few well-known refuges for tertiary flora in the Colchic region. Deciduous temperate forests are in uninterrupted existence in this region since Tertiary. The largest natural forest ecosystems of Europe and Mid-Asia are found in this region. The main ecosystem types are boreal coniferous forest and temperate deciduous forest [2,3,4].

Some floristic studies were carried out in localities close to the research area by Anşin (1979), Düzenli (1988), Vural (1996), Güner & Duman (1998), Eminağaoğlu & Anşin (2003, 2004), and Eminağaoğlu et al. (2006, 2008). According to the Flora of Turkey (Davis, 1965-1985; Güner et al., 2000), many Turkish and foreign researchers have visited and collected plant specimens from around Artvin (Davis, 1965-1985; Mirov, 1967; Davis et al., 1988; Güner et al., 2000).

Study Area. The study area is not only located within the Caucasus Hotspot, one of the 25 World Biodiversity Hotspots identified by the Conservation International, but also within the Caucasus-Anatolian-Hyrcanian Temperate Forests classified as one of the 200 Global Ecoregions [2,3]. Moreover, it lies within the North-eastern Anatolia Centre of Plant Diversity (SWA No.19) and covers the Karçal Mountains, Yalnızçam Mountains, Çoruh Valley and East Black

Sea Mountains, designated as 4 of the 122 Important Plant Areas (IPA) in Turkey [5,6].

The location of Artvin and its immediate surroundings are shown in Figure 1. There are 7 district including Şavşat, Ardanuç, Yusufeli, Borçka, Murgul, Hopa and Arhavi along with many villages, kışlas (pastures found in the lower parts of mountains) and yaylas (pastures found in the higher parts of mountains) that local people live in during spring and summer, respectively.

The altitude of the area ranges from 100 m to 3925 m . This area is about 735900 ha. with Karagöl-Sahara National Park (3466 ha), Hatila Valley National Park (16988 ha), Camili Biosphere Reserve (27152 ha), Borçka-Karagöl Nature Park (368 ha), Camili-Gorgit Strict Nature Reserve (490.5 ha), Camili-Efeler Forest Strict Nature Reserve (1453 ha.) and Çamburnu Strict Nature Reserve (180 ha.).

In the study area, the meteorological stations are located in Artvin (597 m), Borçka (120 m) and Şavşat (1100 m). According to the values from Borçka station, data were obtained between 1971 and 1996 [7], the mean annual temperature is 13.5 °C and precipitation is 1010.2 mm. The values of "M" and "m" of the hottest and coldest months were 27.1 and 1 °C, respectively. The coldest month is February, with a minimum temperature of -9.8 °C, and the hottest month is August, with a maximum temperature of 42.4 °C. The rainfall regime of the study area is "autumn-winter-summer-spring" of semi-terrestrial origin [8].

Meteorological data were obtained between 1971 and 1996 in Şavşat (DMİ, 2001). The mean annual temperature is 9.8 °C and precipitation is 737.9 mm. The values of "M" and "m" of the hottest and coldest months were 29.3 and -6.0 °C. The coldest month is February with a minimum temperature of -19.9 °C and the hottest month is August with a maximum temperature of 38.1 °C. The rainfall regime of the study area is "summer-spring- winter-autumn" of semi-terrestrial origin.

Meteorological data were obtained between 1948 and 1997 in Artvin (DMİ, 2001). The mean annual temperature is 12.3 °C and precipitation is 689.4 mm. The values of "M" and "m" of the hottest and coldest months were 32.0 and -2.48 °C. The coldest month is February with a minimum temperature of -16.1 °C and the hottest month is August with a maximum temperature of 43.0 °C. The rainfall regime of the study area is "autumn-winter-summer-spring" of semi-terrestrial origin.

The geological structure of the research area mostly contains rocks belonging to the Upper Cretaceous period. There are 7 large soil groups in the study area, namely, brown forest soils, noncalcareous brown forest soils, alluvial soils, colluvial soils, red-yellow podzolic soils, and high mountain meadow soils[9,10,11]. The most common of these soil groups is Brown forest soils. Both brown forest soils and noncalcareous brown forest soils are generally found in forested lands. Areas with alpine vegetation generally consist of high mountain meadow soils while alluvial and colluvial soils are only present locally in streambanks and small plains.

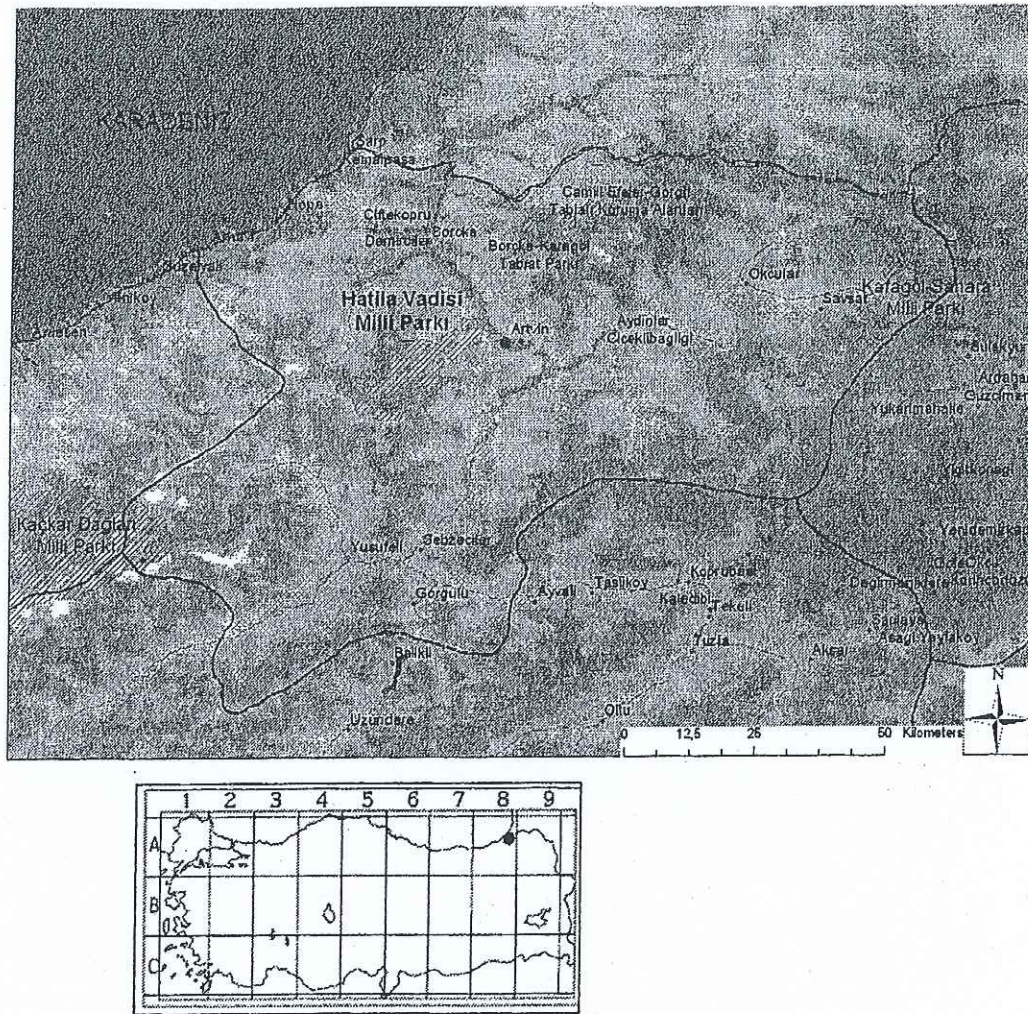


Figure 1. Location of the study area (Kurdoğlu, 2007)

Flora. In Turkey, according to the Flora of Turkey [12], there are 8988 species (2991 endemic), 10754 taxa (3708 endemic) belonging to 1168 genera and 163 families. Of the 10754 taxa, 101 Pteridophytes and 10653 Spermatophytes were detected. Spermatophytes also contained 35 Gymnospermae and 10618 Angiospermae taxa.

In Artvin, according to the Flora of Turkey [12], there are 1219 species, 1268 taxa belonging to 502 genera and 112 families. Of the 1268 taxa, 37 Pteridophytes and 1231 Spermatophytes were detected. Spermatophytes also contained 8 Gymnospermae and 1223 Angiospermae taxa.

Pseudomacchie, forest, alpine, subalpine, rocky, and hydrophytic are the main vegetation types in Artvin. Forest vegetation is the most widespread in the study area.

Pseudomacchie vegetation was distributed throughout the area, especially at altitudes of 200-600 m. There are a few *Pinus pinea* L. (Pinaceae) stands distributed sporadically at the junction of the Hatila valley and the Çoruh River

named Fıstıklı village (formerly Naşviye). On the other hand, it has been questioned whether *Pinus pinea* L. stands here are natural distribution or plantation. In the stands of *Pinus pinea* L. in Fıstıklı village, many herbaceous and woody plants specifically growing in the Mediterranean region are located in the transition zone between the Euro-Siberian and Mediterranean regions. Eminağaoğlu and Anşın (2003) believed that the *Pinus pinea* L. stands had distributed indigenously because of the many other herbaceous and woody Mediterranean taxa. They are as follows: *Trachomitum venetum* (L.) Woodson subsp. *sarmatiense* (Woodson) Avet. (Apocynaceae), *Cistus creticus* L., *C. salviifolius* L. (Cistaceae), *Olea europaea* L. var. *sylvestris* (Mill.) Lehr and *Jasminum fruticans* L. (Oleaceae).

Forest vegetation includes *Abies nordmanniana* (Stev.) Spach. subsp. *nordmanniana*, *Picea orientalis* (L.) Link, *Pinus sylvestris* L., *Taxus baccata* L., *Ulmus glabra* Huds., *Castanea sativa* Mill., *Fagus orientalis* Lipsky, *Quercus petraea*, (Matt.) Liebl. subsp. *iberica* (Steven ex M.Bieb.) Krassiln., *Populus tremula* L., *Salix caucasica* Andersson, *Carpinus betulus* L., *Corylus avellana* L., *Ostrya carpinifolia* Scop., *Rhododendron luteum* Sweet, *R. ponticum* L., *Laurocerasus officinalis* Roem., *Rubus platyphyllos* C.Koch, *Crataegus microphylla* C.Koch, *C. monogyna* Jacq. subsp. *monogyna*, *Ilex colchica* Pojark., *Acer campestre* L. var. *campestre*, *Fraxinus angustifolia* Vahl. subsp. *oxycarpa* (M.Bieb. ex Willd.) Franco & Rocha Afonso, *Sambucus nigra* L., *Tilia rubra* DC. subsp. *caucasica* (Rupr.) V.Eng., *Hedera helix* L. and *H. colchica* (C.Koch) C.Koch.

Subalpine vegetation includes *Betula medwediewii* Regel, *B. recurvata* (I.V.Vassil.) A.V.Vassil., *B. litwinowii* Doluch., *Quercus pontica* C.Koch, *Rhododendron caucasicum* Pall., *Juniperus communis* L. subsp. *saxatilis* Pall., *Vaccinium myrtillus* L., *Daphne glomerata* Lam., *Acer trautvetteri* Medw., *Sorbus aucuparia* L., *Ribes biebersteinii* Berl. ex DC., *Rubus idaeus* L., *Sorbus umbellata* (Desf.) Fritsch. var. *cretica* (Lindl.) Schneid., *Lonicera caucasica* Pall. subsp. *caucasica*, *Viburnum lantana* L. and *Empetrum nigrum* L. subsp. *hermaphroditum* (Hagerup) Bocher.

Hydrophytic vegetation is found in streamside and lakeside. The characteristic species of stream vegetation are *Alnus glutinosa* (L.) Gaertn. subsp. *barbata* (C.A.Mey.) Yalt., *Salix alba* L. and *Tamarix tetrandra* Pall. Ex Bieb.

Rhodothamnus sessilifolius P.H.Davis and *Rhamnus microcarpus* Boiss. are commonly found in the rocky parts of the research area.

MATERIALS AND METHODS. The materials of this study are some 8000 vascular plant specimens collected from Artvin province between 1993 and 2008. At least 1 sample for each taxon was prepared by herbarium techniques [13] and kept at the Artvin Çoruh University, Faculty of Forestry Herbarium in Artvin. These specimens were mainly identified using the Flora of Turkey [1, 12, 14], other floras [15, 16, 17] and revisions [18]. The floristic elements are listed in the Table 1. All taxa in the floristic list are given according to the order in the Flora of Turkey [1].

In the Table 1, every woody taxa of the Artvin (Turkey) species is represented with the following details: family and taxon name, authors of the species, geographical locations, altitudes. In addition, endemism, IUCN threat categories, their phytogeographical regions, and the life forms (according to the classification by Raunkiaer[19, based on the location of overwintering, perennating parts are given. Threatened categories are proposed for the endemic and some nonendemic taxa according to IUCN risk categories (Ekim et al., 2000; IUCN, 2001). The phytogeographical regions of the taxa were evaluated according to Davis (1965-85, 1988). Author abbreviations of plant names are given according to Brummitt & Powell (1992).

The abbreviations used in the text and in the floristic list are as follows: Euro-Sib: Euro-Siberian element; Eux: Euxine element; Hyrc-Eux: Hyrcano-Euxine element; Ir-Tur: Irano-Turanian element; Medit: Mediterranean element; E: East; mt: mountain; EN: Endangered; LC: Least concern; NE: Not evaluated; NT: Near threatened; VU: Vulnerable; Chp: Chamaephytes; Php: Phanerophytes; Vp: vasicular parasite. Euro-Sib (mt), Hyrc-Eux, Hyrc-Eux (mt), Eux, and Eux (mt) species were evaluated as subcategories of Euro-Sib, while Medit, E.Medit, and E.Medit (mt) species were evaluated as subcategories of the Mediterranean phytogeographical region.

RESULTS AND DISCUSSION The dendroflora of the Artvin district is represented by 171 taxa, 119 species, 33 subspecies, and 19 varieties belonging to 81 genera and 42 families. Gymnosperms and Angiosperms comprised 8 and 163 taxa, respectively. The list of the woody taxa that were defined in the study area is shown in Table 1.

Table 1. The woody taxa of Artvin (abbreviations are below the table).

FAMILY AND TAXA NAME	Location	Altitude (m)	Life form	Phytogeographical region	Endemism
PINACEAE					
<i>Abies nordmanniana</i> (Stev.) Spach subsp. <i>nordmanniana</i>	1, 2, 3, 5	1400 - 1950	Php	Eux.	
<i>Picea orientalis</i> (L.) Link	1, 2, 3, 4, 5	650 - 2250	Php	Eux.	
<i>Pinus sylvestris</i> L. var. <i>hamata</i> Stev.	1, 2, 3	850 - 2200	Php	Euro-Sib.	
<i>P. pinea</i> L.	2, 4	550	Php	Medit.	
TAXACEAE					
<i>Taxus baccata</i> L.	1, 2, 3	1000-1350	Php		
CUPRESSACEAE					
<i>Juniperus communis</i> L. var. <i>saxatilis</i> Pall.	1, 2, 3	1800-2300	Php		
<i>J. oxycedrus</i> L. subsp. <i>oxycedrus</i>	1, 2, 3	500 - 1450	Php		
<i>J. foetidissima</i> Willd.	2, 3	600	Php		

		1200			
RANUNCULACEAE					
		700	-		
<i>Clematis vitalba</i> L.	1, 2, 3	1350	Chp		
<i>C. orientalis</i> L.	2	400	Chp		
BERBERIDACEAE					
		1970	-		
<i>Berberis vulgaris</i> L.	2, 3	2000	Chp	Eux.	
CAPPARACEAE					
<i>Capparis ovata</i> Desf. var. <i>herbacea</i> (Willd.) Zohary	2	250	Chp		
CISTACEAE					
<i>Cistus creticus</i> L.	2, 4	350	Chp.	Omni-Medit.	
		370	-		
<i>C. salviifolius</i> L.	2, 3, 4	400	Chp.	Medit.	
POLYGONACEAE					
<i>Atraphaxis billardieri</i> Jaub. & Spach var. <i>tournefortii</i> (Jaub. & Spach) Cullen	4	500	Chp	Ir-Tur	
TAMARICACEAE					
	1, 2, 3,	350	-		
<i>Tamarix tetrandra</i> Pall. ex M. Bieb.	4	970	Php.		
		170	-		
<i>T. smyrnensis</i> Bunge	1, 2, 4	950	Php.		
GUTTIFERAE					
	1, 2, 3,	370	-		
<i>Hypericum androsaemum</i> L.	5	950	Chp.	Euro-Sib.	
TILIACEAE					
	1, 2, 3,	700	-		
<i>Tilia rubra</i> DC. subsp. <i>caucasica</i> (Rupr.) V. Engl.	5	1450	Php.	Eux.	
ACERACEAE					
<i>Acer tataricum</i> L.	1, 3	1000	Php.		
	1, 2, 3,	1950	-		
<i>A. trautvetteri</i> Medw.	5	2550	Php.	Eux.	
<i>A. cappadocicum</i> Gled. var. <i>cappadocicum</i>	1, 2, 3, 5	800 - 1850	Php.	Hyc-Eux.	
<i>A. cappadocicum</i> Gled. var. <i>stenocarpum</i>	1, 2, 3	1370-1550	Php.	Eux.	Endemic, VU
		1100	-		
<i>A. platanoides</i> L.	1, 2, 3	1300	Php.	Euro-Sib.	
<i>A. divergens</i> Pax. var. <i>divergens</i>	2, 4	350	Php.		Endemic, VU
<i>A. divergens</i> Pax. var. <i>trilobum</i> Yalt.	4	350	Php.	Ir-Tur	Endemic, VU
		1100	-		
<i>A. campestre</i> L. subsp. <i>campestre</i>	1, 2, 3	1300	Php.		
		850	-		
<i>A. campestre</i> L. subsp. <i>leiocarpum</i>	1, 2, 3	1150	Php.	Euro-Sib.	
<i>A. hyrcanum</i> Fisch. & Mey. subsp. <i>hyrcanum</i>	2, 3	400 - 1400	Php.	Euro-Sib.	

STAPHYLEACEAE					
<i>Staphylea pinnata</i> L.	3	400	Php.		
RHAMNACEAE					
<i>Paliurus spina-christi</i> Mill.	1, 2, 3	470 1200	- Chp.		
<i>Zizyphus jujuba</i> Mill.	4	500	Chp.-		
<i>Frangula alnus</i> Mill. subsp. <i>alnus</i>	1, 2, 3	700 1700	- Php.	Euro- Sib.	
<i>Rhamnus imeretinus</i> Booth	1, 2, 3	1500 1650	- Chp.	Eux.	
<i>R. microcarpus</i> Boiss.	1, 2, 3	1200 1550	- Chp.	Eux. (mt)	
<i>R. pallasii</i> Fisch. et. Mey.	4	500	Chp		
AQIFOLIACEAE					
<i>Ilex colchica</i> Pojark.	1, 2, 3	970 1900	- Chp.	Eux.	
ANACARDIACEAE					
<i>Cotinus coggyria</i> Scop.	1, 2, 3	500- 1100	Chp.		
<i>Rhus coriaria</i> L.	1, 2, 3	750 1470	- Chp.		
<i>Pistacia terebinthus</i> L. subsp. <i>palaestina</i> (Boiss.) Engler	2, 3	1100 1500	- Chp.	Medit.	
CELASTRACEAE					
<i>Euonymus latifolius</i> (L.) Mill. subsp. <i>latifolius</i>	1, 2, 3	1200 1300	- Chp.	Euro-Sib.	
<i>Euonymus latifolius</i> (L.) Mill. subsp. <i>caucanensis</i> Coode & Cullen	1, 2	1450			Endemic, LR
<i>Euonymus europaeus</i> L.	3	1600	Chp.	Euro-Sib.	
LEGUMINOSAE					
<i>Chamaecytisus hirsutus</i> (L.) Link	1, 2, 3	650 1450	- Chp.		
<i>Genista tinctoria</i> L.	1, 2, 3	460 1450	- Chp.	Euro-Sib.	
<i>Genista albida</i> Willd.	2	950	Chp.		
<i>Colutea armena</i> Boiss. & Huet	1, 2, 3	750 1550	- Chp.		
<i>Caragana grandiflora</i> (M.Bieb.) DC	4	500	Chp.	Ir-Tur	
<i>Astragalus aureus</i> Willd.	2	1350	Chp.	Ir-Tur	
<i>A. microcephalus</i> Willd.	1	1250	Chp.	Ir-Tur	
<i>A. sommieri</i> Freyn	1, 2	1150 1600	- Chp.		VU
<i>A. imbricatus</i> (Boriss.) Boriss.			Chp.		Endemic, DD
<i>A. woronowii</i> Bornm.			Chp.		DD
ROSACEAE					
<i>Laurocerasus officinalis</i> Roem.	2, 3, 5	1350 1900	- Php.		
<i>Prunus spinosa</i> L. subsp. <i>dasyphylla</i> (Schur) Domin	2, 3	1300 1700	- Php.	Euro-Sib.	

<i>Cerasus avium</i> (L.) Moench	1, 2, 3, 5	400 1650	- Php.		
<i>Rubus idaeus</i> L.	1, 2, 3, 5	1370 1850	- Chp.		
<i>R. caesius</i> L.	2, 3, 5	1200 1570	- Chp.		
<i>R. sanctus</i> Schreber	3, 5	1100	Chp.		
<i>R. discolor</i> Weihe & Nees	1, 3, 5	1150	Chp.		
<i>R. canescens</i> DC. var. <i>canescens</i>	1, 3, 5	1750	Chp.		
<i>R. hirtus</i> Waldst. & Kit.	3, 5	700	Chp.	Euro-Sib.	
<i>R. platyphyllos</i> C. Koch	1, 2, 3, 5	1250 1270	- Chp.	Eux.	
<i>R. caucasicus</i> Focke	1, 2, 3, 5	1800 2200	- Chp.	Eux.	
<i>Rosa pimpinellifolia</i> L.	1, 2, 3, 5	1550 1850	- Chp.	Euro-Sib.	
<i>R. elymaitica</i> Boiss. & Hausskn.	2, 4	1600	Chp.	Ir-Tur	
<i>R. hirtissima</i> Lonacz.	1, 3, 5	700 1950	- Chp.	Eux.	VU
<i>R. iberica</i> Stev.	1, 2, 3	1450 1800	- Chp.		
<i>R. montana</i> Chaix subsp. <i>woronowii</i> (Lonacz.) Ö. Nilsson	1, 2, 3, 5	1800 2200	- Chp.		
<i>R. canina</i> L.	1, 2, 3, 5	450 1550	- Chp.		
<i>Mespilus germanica</i> L.	1, 2, 3, 5	800 1550	- Chp.	Hycr-Eux.	
<i>Cotoneaster integerrimus</i> Medik.	1, 3	1950	Chp.		
<i>C. nummularia</i> Fisch. & C. A. Mey.	1, 2, 3	1200 2000	- Chp.		
<i>C. transcaucasicus</i> Pojark.	1, 2	1950	Chp.		VU
<i>C. morulus</i> Pojark.	1, 2, 3	750 850	- Chp.		
<i>Pyracantha coccinea</i> Roem.	1, 2, 3	550 850	- Chp.		
<i>Crataegus pentagyna</i> Waldst. & Kit. Ex Willd.	1, 2, 3	1250 1550	- Php.	Euro-Sib.	
<i>C. orientalis</i> Pall. Ex Bieb. var. <i>orientalis</i>	1, 2, 3	700 1870	- Php.		
<i>C. szovitsii</i> Pojark.	1	1250	Php.		
<i>C. curvicephala</i> Lindm.	2	1870	Php.		
<i>C. monogyna</i> Jacq. subsp. <i>monogyna</i>	1, 2, 3, 5	1000 1500	- Php.		
<i>C. monogyna</i> Jacq. subsp. <i>azarella</i> (Gris.) Franco	2	720	Php.		
<i>C. microphylla</i> C. Koch.	1, 2, 3	900 1325	- Chp.	Hycr-Eux.	
<i>Sorbus aucuparia</i> L.	1, 2, 3	1400 2400	- Php.	Euro-Sib.	
<i>S. subfusca</i> (Ledeb.) Boiss.	3	2400	Php.	Eux.	

<i>S. umbellata</i> (Desf.) Fritsch var. <i>umbellata</i>	1	1950	Php.		
<i>S. umbellata</i> (Desf.) Fritsch var. <i>cretica</i> (Lindl.) Schneid.	1, 2, 3, 5	1250 - 2250	Php.		
<i>S. umbellata</i> (Desf.) Fritsch var. <i>orbiculata</i> (Karpati) Gabr.	2, 3	1450 - 2300	Php.		
<i>S. torminalis</i> (L.) Crantz. var. <i>torminalis</i>	1, 2, 3	1250 - 1750	Php.	Euro-Sib.	
<i>S. caucasica</i> Zinserl. var. <i>yaltirikii</i>	4	1900	Php.		
<i>Pyrus communis</i> L. subsp. <i>communis</i>	2	1400	Php.		
<i>P. communis</i> L. subsp. <i>caucasica</i> (Fed.) Browicz.	1, 3	1270 - 1600	Php.		
<i>P. elaeagnifolia</i> Pall. subsp. <i>elaeagnifolia</i>	2	1570	Php.		
<i>Amelanchier rotundifolia</i> (Lam.) Dum. Cours. subsp. <i>rotundifolia</i>	2	700	Php.		
PUNICACEAE					
<i>Punica granatum</i> L.	2, 3	260 - 400	Php.		
GROSSULARIACEAE					
<i>Ribes biebersteinii</i> Berl. Ex DC	1, 2, 3, 5	800 - 2250	Chp.	Eux.	
<i>R. alpinum</i> L.	2	2300	Chp.		
<i>R. orientale</i> Desf.	1, 3	1950	Chp.		
ARALIACEAE					
<i>Hedera helix</i> L.	2, 3, 5	1370 - 1500	Chp.		
<i>H. colchica</i> (C. Koch.) C. Koch	1, 2, 3	1400 - 1550	Chp.	Eux.	
CORNACEAE					
<i>Cornus sanguinea</i> L. subsp. <i>australis</i> (C.A.Mey.) Jav.	1, 2, 3	800 - 1100	Php.	Euro-Sib.	
<i>C. sanguinea</i> L. subsp. <i>cilicica</i> (Wangerin) Chamb.	2	560		East Medit.	
<i>C. mas</i> L.	1, 2, 3	400 - 1100	Php.	Euro-Sib.	
CAPRIFOLIACEAE					
<i>Sambucus nigra</i> L.	1, 2, 3, 5	400 - 1900	Php.	Euro-Sib.	
<i>Viburnum lantana</i> L.	1, 2, 3	1900 - 1950	Chp.	Euro-Sib.	
<i>V. orientale</i> Pall.	1, 2, 3	1750 - 1900	Chp.	Eux.	
<i>V. opulus</i> L.	2, 3	800 - 1400	Chp.	Euro-Sib.	
<i>Lonicera caucasica</i> Pall. subsp. <i>caucasica</i>	1, 2, 3	1300 - 1950	Chp.		
<i>L. iberica</i> M.Bieb.	1, 3, 4	1400	Chp.	Hycr-Eux.	
<i>L. caprifolium</i> L.	1, 3	1100	Chp.		
ERICACEAE					

<i>Rhododendron luteum</i> Sweet	1, 2, 3, 5	1200 1650	- Chp.	Eux.	
<i>R. ungerii</i> Trautv.	2, 3, 5	1900 2550	- Php.	Eux.	VU
<i>R. smirnovii</i> Trautv.	2, 3, 5	2000 2400	- Php.	Eux.	VU
<i>R. caucasicum</i> Pall.	1, 2, 3, 5	2100 2200	- Chp.	Eux.(mt)	
<i>R. ponticum</i> L.	1, 2, 3, 5	1530 1900	- Chp.	Eux.	
<i>R. x sochadzeae</i> Kharadze & Davlian	2, 3, 5	1400 1700	- Chp.	Eux.	
<i>R. x rosifaciens</i> R. Milne	5	1650	Chp		
<i>R. x davisianum</i> R. Milne	5	2000	Chp		
<i>R. x filidactylis</i> R. Milne	5	1750	Chp		
<i>Epigaea gaultherioides</i> (Boiss. & Ball) Takht.	2, 3, 5	1800 2300	- Chp.	Eux.	VU
<i>Arbutus andrachne</i> L.	2, 4	500	Php.		
<i>Vaccinium myrtillus</i> L.	1, 2, 3, 5	2100 2170	- Chp.	Euro-Sib.	
<i>V. uliginosum</i> L.	3, 5	2000	Chp		
<i>V. arctostaphylos</i> L.	1, 2, 3, 5	1350 1550	- Chp	Eux.	
<i>Rhodothamnus sessilifolius</i> P.H.Davis	5	2250	Chp	Eux.(mt)	Endemic, EN
EBENACEAE					
<i>Diospyros lotus</i> L.	1, 2, 3	400 900	- Php.		
OLEACEAE					
<i>Jasminum fruticans</i> L.	2, 4	350	Chp.	Medit.	
<i>Fraxinus angustifolia</i> Vahl. subsp. <i>oxycarpa</i> (M. Bieb. ex Willd) Franco & Rocha Afonso	1, 2, 3, 5	900 1650	- Php.	Euro- Sib.	
<i>Olea europaea</i> L. var. <i>sylvestris</i> (Miller) Lehr.	2, 4	350	Php.	Medit.	
<i>Osmanthus decorus</i> (Boiss. & Ball) Kasapligil	2, 3, 4	700 1230	- Chp.	Eux.	VU
APOCYNACEAE					
<i>Trachomitum venetum</i> (L.) Woodson subsp. <i>sarmatiense</i> (Woodson) Avet.	2, 4	260	Chp.	East Medit.	
ASCLEPIADACEAE					
<i>Periploca graeca</i> L. var. <i>graeca</i>	3, 4	300-700	Chp.	East Medit.	
ELAEAGNACEAE					
<i>Hippophae rhamnoides</i> L. subsp. <i>caucasica</i> Rousi	4	500	Chp		
THYMELAEACEAE					
<i>Daphne mezereum</i> L.	1, 3	1950	Chp.	Euro-Sib.	
<i>D. glomerata</i> Lam.	1, 2, 3, 5	2000 2250	- Chp.	Eux.	

LORANTHACEAE						
<i>Arceuthobium oxycedri</i>	1, 3, 4	1550	Vp.			
<i>Viscum album</i> L. subsp. <i>album</i>	1, 2, 3, 5	1200 - 1300	Vp.			
BUXACEAE						
<i>Buxus sempervirens</i> L.	2, 3, 5	350 - 2100	Php.	Euro-Sib.		
EMPETRACEAE						
<i>Empetrum nigrum</i> L. subsp. <i>hermaphroditum</i> (Hagerup) Böcher	1, 3, 5	2000-2400	Chp			
MORACEAE						
<i>Ficus carica</i> L. subsp. <i>carica</i>	2, 3, 4	250-600	Php.			
ULMACEAE						
<i>Ulmus glabra</i> Huds.	1, 2, 3, 5	1250 - 1750	Php.	Euro-Sib.		
<i>U. minor</i> Mill. subsp. <i>minor</i>	2, 4	800	Php.			
<i>Celtis glabrata</i> Steven ex Planchon	4	300-600	Chp.			
JUGLANDACEAE						
<i>Juglans regia</i> L.	1, 2, 3, 5	1100 - 1600	Php.			
PLATANACEAE						
<i>Platanus orientalis</i> L.	2, 4	300	Php.			
FAGACEAE						
<i>Fagus orientalis</i> Lipsky	1, 2, 3, 5	1200 - 2250	Php.	Euro-Sib.		
<i>Castanea sativa</i> Mill.	2, 3, 5	800 - 1650	Php.	Euro-Sib.		
<i>Quercus pontica</i> C. Koch.	3, 5	900	Chp.	Eux.	VU	
<i>Q. hartwissiana</i> Steven	1, 2, 3	1300 - 1550	Php.			
<i>Q. petraea</i> (Matt.) Liebl. subsp. <i>iberica</i> (Steven ex Bieb.) Krassiln.	1, 2, 3	350 - 1200	Php.			
CORYLACEAE						
<i>Carpinus betulus</i> L.	1, 2, 3, 5	850 - 1650	Php.	Euro-Sib.		
<i>C. orientalis</i> Mill. subsp. <i>orientalis</i>	2, 3, 4	600	Php.			
<i>Ostrya carpinifolia</i> Scop.	1, 2, 3, 4, 5	950 - 1650	Php.	Medit.		
<i>Corylus avellana</i> L. var. <i>avellana</i>	1, 2, 3, 5	350 - 1150	Chp.	Euro-Sib.		
<i>C. avellana</i> L. var. <i>pontica</i> (C. Koch) Winkler	1, 3	1370	Chp.	Eux.		
BETULACEAE						
<i>Betula medwediewii</i>	3, 5	1300 - 1900	Php.	Eux.		
<i>B. pendula</i> Roth	2, 3, 5	1800 - 1950	Php.			
<i>B. litwinowii</i> Doluch.	1, 2, 3, 5	1950 - 2200	Php.	Eux.		

<i>B. recurvata</i> (I. V. Vassil.) A. V. Vassil.	1, 2, 3, 5	1350 1900	-	Php.	Eux.	
<i>B. browicziana</i> A. Güner	5			Php	Eux.	Endemic, VU
<i>Alnus glutinosa</i> (L.) Gaertn. subsp. <i>barbata</i> (C.A.Mey) Yalt.	1, 2, 3, 5	400 1800	-	Php.	Eux.	
SALICACEA						
<i>Salix alba</i> L.	1, 2, 3, 4	350 1450	-	Php.	Euro-Sib.	
<i>S. caucasica</i> Andersson	1, 2, 3	1600		Chp.	Eux.	VU
<i>S. caprea</i> L.	1, 2, 3, 5	1350 1900	-	Php.	Euro-Sib.	
<i>S. pseudomedemii</i> E. Wolf	1, 2, 3	1870 1890	-	Php.	Eux.	
<i>S. armenorossica</i> A. K. Skvortsov	1	1370		Php.	Eux.	
<i>S. elbursensis</i> Boiss.	1	1270		Php.	Hyr-Eux.	
<i>S. pedicellata</i> Desf. subsp. <i>pedicellata</i>	4			Php.	Medit.	
<i>S. triandra</i> L. subsp. <i>bornmuelleri</i> (Hauskn.) A. Skv.	4			Php.	Ir-Tur	
<i>S. wilhelmsiana</i> Bieb.	4			Php.	Ir-Tur	
<i>Populus tremula</i> L.	1, 2, 3	1270 2450	-	Php.	Euro-Sib.	

Abbreviations:

1. Flora of the Karagöl-Sahara National Park (Artvin) and Its Environs.
2. The Flora of Hatila Valley National Park and its Close Environs (Artvin).
3. Flora of the Camili Biosphere Reserve Area (Borçka, Artvin, Turkey).
4. Çoruh Valley Important Plant Area.
5. Flora of the Tiryal (Alacadağ) Mountain.

The richest families in terms of number of woody taxa were Rosaceae (41), Ericaceae (15), Aceraceae (10), Leguminosae (10) and Salicaceae (10).

The richest genera in terms of the number of woody taxa were *Acer* L. (10), *Rhododendron* L. (9), *Salix* L. (9), *Rubus* L. (8), *Crataegus* L. (7), *Sorbus* L. (7), *Rosa* L. (6), *Betula* L. (5) and *Astragalus* L. (5).

In this study, we were unable to collect some taxa that were cited in the Flora of Turkey. These are *Astragalus woronowii* Bornm. and *A. imbricatus* (Boriss.) Boriss. (Leguminosae).

The life-form spectrum of the taxa was as follows: chamaephytes 38 (22.2%), phanerophytes 131 (76.6%), and vasicular parasite 2 (1.2%).

The area is a very important relictual refuge for many plant species that are remnants of an ancient Mediterranean flora such as *Trachomitum venetum* (L.) Woodson subsp. *sarmatiense* (Woodson) Avet. (Apocynaceae), *Periploca graeca* L. var. *graeca* (Asclepidaceae), *Cistus creticus* L., *C. salviifolius* L. (Cistaceae), *Olea europaea* L. var. *sylvestris* (Mill.) Lehr, *Jasminum fruticans* L. (Oleaceae),

Pistacia terebinthus L. subsp. *palaestina* (Boiss.) Engler, *Cotinus coggygria* Scop. and *Rhus coriaria* L. (Anacardiaceae) (Eminağaoğlu et al., 2006).

The uniqueness of the presence of many relict plant species in the region is largely due to the fact that the Caucasus was spared from the severe effects glacial retreats during the last Ice Age. The region is also unique with respect to the fact that there are many relict plant species including *Picea orientalis* (L.) Link, *Abies nordmanniana* (Stev.) Spach. subsp. *nordmanniana* (Pinaceae), *Betula medwediewii* Regel (Betulaceae), *Quercus pontica* C.Koch (Fagaceae), *Epigaea gaultherioides* (Boiss. & Ball) Takht., *Rhododendron ungeri* Trautv., *R. smirnovii* Trautv. (Ericaceae) and *Osmanthus decorus* (Boiss. & Ball) Kasaplıgil (Oleaceae) (Zazanashvili et al., 1999).

The woody taxa of the study area, categorised according to phytogeographic regions, can be listed as follows: Euro Siberian elements 74 (43.3%), Irano-Turanian elements 8 (4.7%), and Mediterranean elements 11 (6.4%). The remaining 78 (45.6%) taxa are multi-regional or of unknown phytogeographic origin. In the area, Euro-Siberian elements are more common than the other phytogeographic region elements. The dominance of the Euro-Siberian elements is not surprising because the study area is located in the Euro-Siberian phytogeographic region. The percentage of Mediterranean elements in our study was high. A possible explanation is that our study area is under the influence of the Mediterranean climate and a local Mediterranean climate occurs in some areas close to the Black Sea region. The flora of the study area mainly resembles Caucasian flora, but it also shares similarities with Japanese and North American flora. The fact that Irano-Turanian elements are the third most common ones in the research area shows that Continental climate has an important effect on the area.

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ოზგურ ემინაღაოღლუ, ფუნდა ერშენი

ართვინის დენდროფლორა

რეზიუმე

ართვინის ვილაეთის დენდროფლორა, რომელიც 171 სახეობას მოიცავს, გაერთიანებულია 81 გვარსა და 42 ოჯახში. მათგან Gymnospermae 8 და Angiospermae 163 სახეობა. მდიდარი ოჯახებია Rosaceae 41 (24%), Ericaceae 15 (8.8%), Aceraceae, Leguminosae და Salicaceae ათ-ათი სახეობა. მდიდარი გვარებია *Acer* L. (10 სახეობა), *Rhododendron* L. და *Salix* L ცხრა-ცხრა სახეობა. დენდროფლორა შემდეგი სასიცოცხლო ფორმებითაა წარმოდგენილი: ჰამეფიტები 38 (22.2%), ფანეროფიტები 131 (76.6%), პარაზიტები 2 (1.2%) სახეობა; ენდემურია 8 სახეობა, 17 სახეობა შეტანილია IUCN წითელ ნუსხაში.