

საქართველოს განათლებისა და მეცნიერების სამინისტრო

MINISTRY OF EDUCATION AND SCIENCE OF GEORGIA

სსიპ ბათუმის ბოტანიკური ბაღი

LEPL BATUMI BOTANICAL GARDEN

მ თ ა მ ბ ე

XXXIII

BULLETIN



BGCI

Plants for the Planet



გამომცემლობა

„შოთა რუსთაველის სახელმწიფო უნივერსიტეტი“

ბათუმი 2009

UDC (უკ) 58:069.029 (479.223)

ბ-179

მთავარი რედაქტორი: დავით ბარათაშვილი

სარედაქციო კოლეგია:

გია ბოლქვაძე – რედაქტორის მოადგილე, გურამ ჩხუბაძე –
პასუხისმგებელი მდივანი, დავით გვიანიძე, ზურაბ მანგელიძე,
ზურაბ ბაკურიძე, ლაშა დოლიძე, ჯუმბერ ლომიძე, ვაგიფ
ატამოვი

რეცენზენტი: მურმან დავითაძე

კომპიუტერული უზრუნველყოფა: მ. სამნიძე, ი. მიქელაძე, ი. დიასამიძე

ინგლისური ტექსტების უზრუნველყოფა: ლ. დავითაძე

ბათუმის ბოტანიკური ბაღის „მოამბე“ გამოდის 1936 წლიდან

EDITOR: Davit Baratashvili

EDITORIAL BOARD:

Gia Bolkvadze-Deputy editor- in-chief, Guram Chkhubadze- Scientific
secretary, Davit Gvianidze, Zurab Manvelidze, Zurab Bakuridze,
Lasha Dolidze, Jumber Lomidze, Vagif Atamov

REVIEWER: Murman Davitadze

COMPUTER DESIGN: M. Samnidze, I. Mikeladze, I. Diasamidze

TRANSLATE INTO ENGLISH BY: L. Davitadze

BULLETIN OF BATUMI BOTANICAL GARDEN *Founded in 1936*

ISSN 1987-8621

© „შოთა რუსთაველის სახელმწიფო უნივერსიტეტი“ – 2009

ზ. მანველიძე აჭარის ბოტანიკურ-გეოგრაფიული დარაიონება	74
Z. Manvelidze Botanical-Geographic Zoning of Ajara	87
დ. გვიანიძე, მ. გვიანიძე ტყის კულტურების ახალი სწრაფმოზარდი მაგარმერქნიანი მუხის <i>Quercus rubra</i> დანერგვის პერსპექტივები	90
D. Gvianidze, M. Gvianidze Perspectives of cultivation of fast-growing valuable bark oak tree in Adjara	99
მ. სამნიძე ზღვისპირა აჭარის ზამთარ-გაზაფხულზე მოყვავილე მცენარეები	100
M. Samnidze Diversity of Wild Growing Plants of Adjara Coastline blossoming in Winter-Spring	104
ი. დიასამიძე აჭარის და აზორის არქიპელაგის (პორტუგალია) ენდემური მრავალფეროვნება	105
Inga Diasamidze Richness of endemic flora between Adjara and Azores	107
V. Atamov, M. Cabbarov Floristic Analysis The Useful Plants Of Mountainous Regions Of Azerbaijan	108
ვ. ატამოვი, მ. კაბაროვი აზერბეიჯანის მთიანი რეგიონის სასარგებლო მცენარეთა ფლორისტული ანალიზი	137
R. Goradze Wetlands study and Concervation in Southern Kolkheta (Adjara)	138
რ. გორაძე სამხრეთ კოლხეთის (აჭარის) წყალ-ჭაობიანი ეკოსისტემების კვლევის შედეგები	150
O. Eminagaoglu The Plant Diversity of Tekkale-Çevreli and Cemketen Villages (Yusufeli, Artvin)	152
ო. ემინაგაოღლი ართვინის ვილაეთის იუსუფელის მცენარეთა მრავალფეროვნება	159
T. Gokturk The Animal Diversity of Tekkale-Çevreli and Cemketen Villages (Yusufeli, Artvin)	160
თ. გოკთურქი ართვინის ვილაეთის ცხოველთა მრავალფეროვნება	168
R. Goradze Central Colkheta Wetlands Research ,Concervation and Management	169
რ. გორაძე კოლხეთის ცენტრალური ჭაობები, კონსერვაცია და მენეჯმენტი	178
გენეტიკა-სელექცია	
დ. ბარათაშვილი, ნ. ხალვაში, ა. მესხიძე საქართველოს ციტრუსოვანთა გენეტიკური რესურსები. რეალობა და პერსპექტივები	179
D. Baratashvili, N. Khalvashi, A. Meskhidze Genetic resources of citrus in Georgia, reality and perspectives	184
ნ. ხალვაში ვაშლის (<i>Malus Mill</i>) სახეობრივი მრავალფეროვნება ბათუმის ბოტანიკურ ბაღში	185
N. Khalvashi Species diversity of Apple (<i>Malus Mill</i>) in Batumi Botanic Garden	190

THE PLANT DIVERSITY OF TEKKALE-ÇEVRELI AND CEMKETEN VILLAGES (YUSUFELI, ARTVIN)

This study aims at determining the floristic content of Two Mineralization Fields and Their Surroundings near Tekkale-Çevreli Villages and Cemketen Village, which are within the Yusufeli district limits of the province Artvin, Northeast of the Eastern Black Sea Region, between 2006-2007. 459 vascular plant taxa in relation with 85 families were identified on the mine site and its surroundings. Of these, 8 taxa are connected to Pteridophyta and 451 taxa are connected to Spermatophyta. 33 endemic plant taxa were identified in the study area and the endemism rate was found to be %7.6. 35 rare plant taxa that are endemic and non-endemic were classified according to the international danger categories of IUCN.

INTRODUCTION. The Caucasus, where the research site is located, is defined as one of the most important 25 continental Ecological Zones by the Conservation International (CI), the World Bank, and the Global Environment Fund as not only being the richest in biological variations but also endangered. The Caucasus, located in the Colchis section of the Euro-Siberian Floristic Zone, is the most significant sheltering and relict area of forests in the Western Eurasia that belong to the Tertiary Period. It is the region of the world in which temperate deciduous forests have been existent without interruption since the Tertiary Period. The largest natural old-growth (ancient) forest ecosystems can be found in this wide geography which covers Europe and Central Asia. (WWF & IUCN, 1994).

The World Wide Fund for Nature (WWF), which agrees on the importance of the Caucasus for protection, also declared the temperate zone forests of the Caucasus as one of the global 200 Ecological Priority Zones.

The study area is located within the "Çoruh Valley Important Plant Area", which is one of the 122 Important Plant Areas identified in Turkey. (ÖZHATAY vd., 2003; 2005)

Some floristic studies were carried out in localities close to the research area by Anşin (1979), Vural (1996), Güner & Duman (1998), Eminağaoğlu & Anşin (2003, 2004), Eminağaoğlu et al. (2006, 2008) and Eminağaoğlu & Erşen Bak (2009). 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; Davis et al., 1988; Güner et al., 2000).

The Flora Survey aims at gathering baseline data regarding the spread and status of vascular plants in the mining area located within the Caucasus Ecological Zone. For this purpose, by analyzing the ecosystems along the river banks such as the

valley, xerophytic bushes, rocky areas, forestry areas, and agricultural fields, it has been planned that the systematic and ecologic aspects of the existent flora shall be uncovered, the species in the endemic and endangered categories shall be identified, and plant materials shall be added to the flora and herbariums of Turkey.

MATERIAL AND METHODS. Plant samples in connection with divisions *Pteridophyta* and *Spermatophyta* that were collected from Two Mineralization Fields and Their Surroundings near Tekkale-Çevreli Villages and Cemketen Village in 2006-2007 constitutes the main material of this research. The materials collected for the area were put into the herbarium of the Forestry Faculty of Artvin Çoruh University. The photographs of plant taxons were taken .

In order to determine the floristic content, attention was given to the existence of vegetative and generative organs such as fruits, flowers, leaves, underground parts, and buds in plant samples collected during the floristic visits performed during the 2006-2007 vegetation period. Information such as GPS coordinates, location, growth area features, elevation, and date of collection was recorded for the collected plant samples. The collected samples were dried and named in line with the herbarium technique.

While the main source for the naming of plant samples that were transformed into herbarium material after being dried was "Flora of Turkey and the East Eagean Islands"(DAVIS 1965-85; DAVIS et al., 1988; GÜNER et al., 2000), other flora sources such as Flora USSR (KOMAROV, 1934-78) and Flora Kavkaza (GROSHEIM, 1939-1967) and plant samples form other herbariums were also used.

While the categories regarding the identified taxons are being given in a systematic list, the family, genus, species, and subspecies categories are given according to the sequence in the Flora of Turkey. In this index, the family, genus, species, subspecies and variety, English name, phytogeographical region, endemism status, national and international importance, habitat, the elevation on which the taxon spreads, and relative abundance rate were shown.

The abbreviations used in the text and in the floristic list are as follows: R: Regional endemic : Endemic for the study area and surroundings (Yusufeli and surroundings, Çoruh River Valley, Artvin and Erzurum Provinces), W: Widely endemic: Endemic for Turkey and widespread in Turkey or Eastern Anatolia, TRDB (Turkish Red Data Book of Plants) (Ekim, et al., 2000) [based on IUCN 1994 criteria (ver 2.3)], EX: Extinct , EW: Extinct in the wild, CR: Critically endangered, EN: Endangered, VU: Vulnerable, LR: Lower risk , cd: conservation dependent, nt: near threatened, lc: least concern, DD: Data deficient, NE: Not evaluated

FINDINGS. With regard to plant geography, Tekkale-Çevreli and Cemketen Villages, in the Yusufeli district of Artvin province, are located in the Colchis sector of the Euxine province of the Euro-Siberian flora zone. The area (Figure 1) is located within A8 squares according to the square system of Davis (DAVIS, 1965).

The taxonomic grouping of 459 taxons identified in the area during field studies of March-October 2006-2007 are given in Table 1.

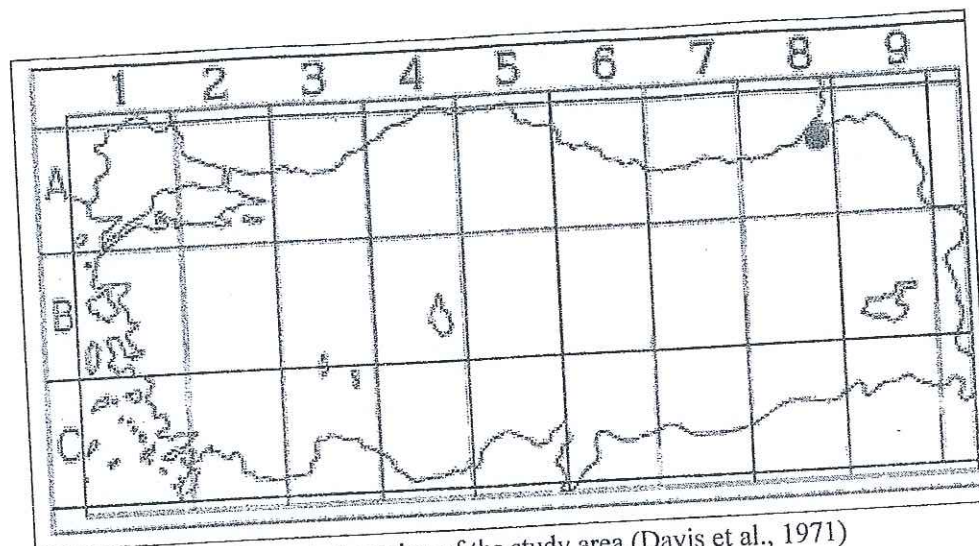


Figure 1. Location of the study area (Davis et al., 1971)

Table 1.

Taxonomic grouping of taxons identified in the area.

	Family Number	Taxon Number
<i>Pteridophyta</i>	6	8
<i>Spermatophyta</i>	79	451
<i>Gymnospermae</i>	3	5
<i>Angiospermae</i>	76	446
Total	85	459

During the field studies implemented in the work site, no plant species that is listed by the IUCN was found. During the field studies, among 459 plant species identified in the mineralization field and surroundings, only two non-endemic plant species are listed in Bern and CITES. They show a wide spread around Turkey. The species which spread between elevations of 20 to 1,350 m in Turkey show a spread from the valley floor, which is outside the work site, to the hills (Table 2).

Table 2.

Species that have International Importance

Taxon	Endemism		National Importance	International Importance		
	R	W		IUCN 2001	BERN Anx1	CITES App1, 2, 3
<i>Anacamptis pyramidalis</i> (L.) L.C.M. Richard	-	-	-	-	-	x
<i>Orchis punctulata</i> Steven ex Lindley	-	-	-	-	x	x

35 rare plants were identified in the area and its surroundings, whereas 33 of these are endemic. The taxons are in either one of the threat categories formed by the Turkish Red Data Book of Plants (Ekim et al., 2000)", namely CR, EN, VU and LR.

One of the taxons is "critically endangered", two of them are "endangered", eight of them are "vulnerable", and twenty three taxons are classified as "lower risk". These species are shown in Table 3.

Table 3

Species that have importance in Turkey

Taxon	Endemism		National Importance
	R	W	
			TRDB
<i>Alyssum artvinense</i> Busch	End.		LR(cd)
<i>Cerastium armeniacum</i> Gren.		End.	LR(lc)
<i>Gypsophila simulatrix</i> Bornm. et Woron.		End.	LR(lc)
<i>Saponaria picta</i>		End.	
<i>Silene armena</i> Boiss. var. <i>armena</i>		End.	LR(lc)
<i>Polycnemum verrucosum</i> Lang			VU
<i>Alcea calvertii</i> (Boiss.) Boiss.		End.	LR(lc)
<i>Acer divergens</i> Pax var. <i>divergens</i>	End.		VU
<i>Haplophyllum armenum</i> Spach.		End.	LR(lc)
<i>Chesneya elegans</i> Fomin		End.	LR(cd)
<i>Genista aucheri</i> Boiss.		End.	LR(lc)
<i>Lathyrus woronowii</i> Bornm.	End.		CR
<i>Onobrychis armena</i> Boiss. et Huet		End.	LR(lc)
<i>Sempervivum staintonii</i> Muirhead	End.		VU
<i>Bupleurum brachiatum</i> C.Koch ex Boiss.		End.	VU
<i>Heracleum platytaenium</i> Boiss.		End.	LR(lc)
<i>Peucedanum palimbioides</i> Boiss.		End.	LR(lc)
<i>Morina persica</i> L.			EN
<i>Helichrysum arenarium</i> (L) Moench subsp. <i>aucheri</i> (Boiss.) Davis & Kupicha		End.	LR(lc)
<i>Tanacetum mucroniferum</i> Hub.-Mor. et Grierson		End.	LR(lc)
<i>Achillea schischkinii</i> Sossn.		End.	LR(lc)
<i>Centaurea pecho</i> Albow	End.		VU
<i>Centaurea hedgei</i> Wagenitz.	End.		VU
<i>Taraxacum turcicum</i> van Soest		End.	LR(lc)
<i>Campanula troegerae</i> Dambolt	End.		EN
<i>Campanula betulifolia</i> C. Koch		End.	LR(lc)
<i>Convolvulus pseudoscammonia</i> C. Koch		End.	LR(lc)
<i>Paracaryum artvinense</i> R. Mill	End.		LR(cd)
<i>Onosma isauricum</i> Boiss. & Heldr.		End.	LR(lc)
<i>Verbascum natolicum</i> (Fisch. & Mey.) Hub.-Mor.		End.	LR(nt)
<i>Linaria genistifolia</i> (L) Miller subsp. <i>artvinensis</i> Davis		End.	VU
<i>Phlomis armeniaca</i> Willd.		End.	LR(lc)
<i>Galium fissurense</i> Ehrend. et Schonb. Tem.		End.	LR(lc)
<i>Iris taochia</i> Woronow ex Grossh.		End.	VU
<i>Iris galatica</i> Siehe		End.	LR(lc)

The vegetation types were determined according to the Braun-Blanquet approach during the field observations. The locations, from which samplings would be performed for the flora, were selected among the central regions of areas in which the flora is homogenous. The sampling plot for each sampling location was wide

enough to include all of the species in the community. In order to widen the sampled area, countless samplings were collected repeatedly from similar areas. The vegetation types and dominant species identified in the area are presented in table 4.

Table 4.

Vegetation Structure of the Area

Vegetation Type	Dominant Species
XEROPHYTIC BUSHES	
<i>Paliurus spina-christii-Acer divergens</i>	<i>Paliurus spina-christi</i>
	<i>Acer divergens</i>
	<i>Juniperus oxycedrus</i>
	<i>Colutea armena</i>
	<i>Cotinus coggyria</i>
	<i>Seseli andronakii</i>
	<i>Vicia woronowii</i>
	<i>Alyssum artvinense</i>
	<i>Genista aucheri</i>
	<i>Stachys viscosa</i> subsp. <i>odontophylla</i>
ROCKY AREAS	
<i>Micromeria elliptica-Stachys viscosa</i>	<i>Stachys viscosa</i> subsp. <i>odontophylla</i>
	<i>Centaurea pecho</i>
	<i>Veronica oltensis</i>
	<i>Seseli andronakii</i>
	<i>Astragalus taochicus</i>
	<i>Micromeria elliptica</i>
	<i>Clypela raddeana</i>
FOREST AREAS	
<i>Quercus petraea-Juniperus oxycedrus</i>	<i>Quercus petraea</i>
	<i>Juniperus oxycedrus</i>
	<i>Ostrya carpinifolia</i>
	<i>Acer divergens</i>
	<i>Paliurus spina-christi</i>
	<i>Rhamnus pallasii</i>
	<i>Cotinus coggyria</i>
	<i>Seseli andronakii</i>
	<i>Ballota rotundifolia</i>
	<i>Phlomis armeniaca</i>

CONCLUSIONS. The floristic content of Tekkale-Çevreli and Cemketen Villages, was determined between 2006-2007. The area, which is between 700-1500 m. elevation, is located in the A8-9 square according to the square method implemented by Davis and included in the Colchis section of the Black Sea province of the Euro-Siberian phytogeographical area of the Holarctic zone.

459 vascular plant taxa in relation with 85 families were identified on the mine site and its surroundings. Of these, 8 taxa are connected to *Pteridophyta* and 451 taxa are connected to *Spermatophyta*.

35 rare plants were identified in the area and its surroundings, whereas 33 of these are endemic. 35 endemic and non-endemic rare plant taxons were classified according to IUCN threat categories. One of the taxons is "critically endangered", two of them are "endangered", eight of them are "vulnerable", and twenty three taxons are classified as "lower risk". These taxons are listed according to IUCN categories below:

Critically Endangered (CR): *Lathyrus woronowii*

Endangered (EN): *Morina persica*, *Campanula troegerae*, *Saponaria picta*

Vulnerable (VU): *Polycnemum verrucosum*, *Acer divergens* var. *divergens*, *Sempervivum staintonii*, *Bupleurum brachiatum*, *Centaurea pecho*, *Centaurea hedgei*, *Linaria genistifolia* subsp. *artvinensis*, *Iris taochia*.

Lower Risk (LR): *Alyssum artvinense*, *Chesneya elegans*, *Paracaryum artvinense*, *Cerastium armeniacum*, *Gypsophila simulatrix*, *Silene armena* var. *armena*, *Alcea calvertii*, *Haplophyllum armenum*, *Genista aucheri*, *Onobrychis armena*, *Heracleum platytaenium*, *Peucedanum palimbioides*, *Helichrysum arenarium* subsp. *aucheri*, *Tanacetum mucroniferum*, *Achillea schischkinii*, *Taraxacum turcicum*, *Campanula betulifolia*, *Convolvulus pseudoscammonia*, *Onosma isauricum*, *Phlomis armeniaca*, *Galium fissurense*, *Iris galatica*, *Verbascum natolicum*.

In order to prevent the taxons of *Alyssum artvinense*, *Acer divergens* var. *divergens*, *Lathyrus woronowii*, *Sempervivum staintonii*, *Centaurea pecho*, *Centaurea hedgei*, *Campanula troegerae*, *Paracaryum artvinense*, which have a spread around the immediate surroundings of the area and whose spread in Turkey is limited to the Artvin province, from possible adverse affects of mining activities, some measures must be considered to be taken. The situation gets more important especially when the dams to be built at the Çoruh Valley, where the taxons show a natural spread, are taken into consideration.

Around the mineralization field, two non-endemic plant species, namely *Anacamptis pyramidalis* and *Orchis punctulata*, are listed in Bern and CITES. They show a wide spread around Turkey. The species which spread between elevations of 20 to 1,350 m in Turkey show a spread from the valley floor, which is outside the work site, to the hills.

The relative abundance of the taxons identified in the study area was evaluated according to the Braun-Blanquet method. 3 distinct vegetation types were identified in the study area.

ACKNOWLEDGEMENTS. This research was performed between 2000-2006 on the demand of Dama Mühendislik A.Ş. from our University with regard to "Determining the Flora Presence of Two Mineralization Fields and Their Surroundings near Tekkale-Çevreli Villages and Cemketen Village". I wish to express my thanks to Senior Forestry Engineer Mimar Sinan ÖZKAYA and Özkan ŞAHİN, and Dr. Temel GÖKTÜRK, lecturer at Faculty of Forestry, Artvin Çoruh University.

REFERENCES

1. Anonymous, 2006. Yusufeli Barajı Ve Hes Projesi Çevresel Etki Değerlendirmesi Raporu, www.dsi.gov.tr.
2. Anşin, R., 1979. Trabzon-Meryemana Araştırma Ormanı Florası ve Saf Ladin Meşcerelerinde Floristik Araştırmalar (Flore de la forêt de Recherches de Meryemana-Trabzon et Les Recherches Floristiques Dans les Peuplements Pura D'Epicea). Trabzon: Karadeniz Gazetecilik ve Matbaacılık Press, 234 pp.
3. Anşin, R., Özkan, Z. C. & Eminağaoğlu, Ö., 2002. Doğu Karadeniz Bölgesi Endemik Taksonları, II. Ulusal Karadeniz Ormancılık Kongresi, Bildiriler Kitabı, Vol. II, 15-18 May 2002, Artvin.
4. Braun-Blanquet, J., 1932. Plant Sociology (Translated By Fuller And Conard), Newyork And London.
5. Brummitt, R., K. & Powell C., E. (eds) 1992. Authors of Plant Names, Royal Botanic Gardens, Kew.
6. Davis, P. H., Harper, P. C. & Hedge, I. C., 1971, Distribution Patterns In Anatolia With Particular Reference To Endemism, Plant Life of South-West Asia, The Botanical Society of Edinburgh.
7. Davis, P. H., Mill, R. R. & Tan, K., 1988. Flora of Turkey And The East Aegean Islands, Vol. X, Supplement, at the University Press, Edinburgh.
8. Davis, P.H., 1965-85, Flora of Turkey and the East Aegean Islands, Vol. I-IX, at the University Press, Edinburgh.
9. Ekim, T., Koyuncu M., Vural M., Duman H., Aytaç Z. & Adıgüzel N., 2000. Türkiye Bitkileri Kırmızı Kitabı, Eğrelti Ve Tohumlu Bitkiler (Red Data Book Of Turkish Plants, Pteridophyta And Spermatophyta), Barışcan Ofset, Ankara, 246 pp.
10. Eminağaoğlu, Ö. & Anşin, R., 2003. The Flora of Hatila Valley National Park And Its Close Environs (Artvin), Turk J Bot, 27: 1-27.
11. Eminağaoğlu, Ö. & Anşin, R., 2004. Flora of the Karagöl-Sahara National Park (Artvin) and its Environs, Turk J Bot, 28: 557-590.
12. Eminağaoğlu O, Kutbay HG, Bilgin A & Yalcın E, 2006. Contribution to the phytosociology and conservation of tertiary relict species in northeastern Anatolia (Turkey). Belg J Bot 139: 124-130.
13. Eminağaoğlu, Ö., Kutbay, H.G., Özkan Z.C. & Ergül, A., 2008. Flora of the Camili Biosphere Reserve Area (Borçka, Artvin, Turkey). Turk J Bot 32: 43-90.
14. Eminağaoğlu, Ö., Erşen Bak, F., 2009. Dendroflora of Artvin. Proc. Of the International Conference of the Biological Diversity of Adjara (South Colchic), 5-7 June 2008, 94-108, Batumi, Georgia.
15. Grossheim, A., A., 1939-1967, Flora Kavkaza, Vol. 1-7, Bakü Ve Leningrad.
16. Güner, A., Özhatay, N., Ekim, T., Başer, K.H.C., 2000, Flora Of Turkey And The East Aegean Islands, Vol. XI, Supplement-II, at The University Press, Edinburgh.
17. Guner A & Duman H, 1998. A floristic excursion to Artvin and Camili. The Karaca Arboretum Magazine 4: 55-85.
18. Komarov, V.L., 1934-78. Flora of The U.S.S.R., Vol. 1-30, Israel Program For Scientific Translations, Jerusalem.
19. Özhatay, N., Byfield, A. & Atay, S., 2003. Türkiye'nin Önemli Bitki Alanları, İstanbul: WWF Türkiye.
20. Özhatay N, Byfield A & Atay S., 2005. Türkiye'nin 122 Önemli Bitki Alanı. İstanbul: WWF Turkey. 476 pp.

21. Vural M., 1996. Rize'nin Yüksek Dağ Vegetasyonu (High mountain vegetation of Rize). Turk J Bot 20: 83-102.
22. WWF & IUCN, 1994. Centres of Plant Diversity. A Guide and Strategy for their Conservation, Volume I- Europe, Africa, South West Asia and the Middle East. Cambridge, IUCN Publications Unit., UK.
23. Zazanashvili N, Sanadiradze G. & Bukhnikashvili A., 1999. Caucasus. In: R.A. Mittermeier, N Meyers, P Robles Gil, and CG Mittermeier. *Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*. Pp. 268-277. CEMEX, Mexico.
24. Zohary, M., 1973, Geobotanical Foundations of The Middle East, Vol. I-II, Gustav Fischer Verlag, Stuttgart.