



Flora of Mtirala National Park

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Abstract:

The vascular flora of the Mtirala National Park (Georgia, Ajara: at present 523 species of 307 genera and 108 families have been registered in the Park, including: Herbaceous - 420; Ferns – 25; Lianas - 5; Trees – 32; Shrubs – 41 species. Of the 523 taxa, 25 Pteridophytes and 496 Spermatophytes were detected. Spermatophytes also contained 1 Gymnospermae and 496 Angiospermae taxa. The richest families in terms of number of taxa were Asteraceae-66, Poaceae-35, Fabaceae-30, Rosaceae-28, Lamiaceae-27, Brassicaceae-26, Scrophyllariaceae-22, Apiaceae-21, Boraginaceae-16, Caryophyllaceae-13. The richest genera are Trifolium-9, Polygonum-7, Rubus -7, Epilobium-6, Hypericum-6, Rumex-5, Stachys-5, Vicia-5, Geranium -5, Viola-5, Veroniva - 5. The endemism ratio is 51 species -9.77 % from the total floristic composition of the National Park the endemic ones is: Caucasian – 22; Georgian – 4; Colchis - 19; Ajara-Lazeti – 4; Ajara – 2. Threat categories were proposed for 6 taxa according to International Union for Conservation of Nature and Natural Resources (IUCN) Red List Categories: 14 species included in “Red List” of Georgia, 46 are recommended for the “Red List” of Caucasus.

Key Terms: Mtirala National Park, Colchis refuge, flora, endemic species.

Introduction:

Mtirala National Park in Minor Caucasus (Georgia), is 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 Colchis region. The area is represented by the world specific Colchis type plants rich in well preserved and totally original tertiary relicts. The park is considerably sizable and is situated over the territory of three municipalities: Kobuleti, Khelvachauri and Keda. Total area of these territories comprises 15806 ha. Hypsometric highest point is m. Kolva 1763.8 m a.s.l.

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 (WWF & IUCN, 1994; Zazanashvili et al., 1999). It is noteworthy that unique Colchis forests of Ajara are listed among 100 unprotected forests embraced by WWF's European Forest Hotspots Campaign (The map-“100 European Forests We Should Protect Now” //WWF international, WCMC, 1997) (Figure 1).

Certain scientific data on the study area can be found in works dated to the beginning of the XIX-XX century; many Georgian and foreign researchers have visited and collected plant specimens from Ajara (Golitsin, 1939; Колаковский 1958, 1961; etc.).

General notes on the specific and ecosystem diversity of the present territory of the Mtirala National Park and its vicinities are found in later publications as well (Gagnidze, Davitadze, 2000; Dmitrieva, 1990 a,b). The dominating ligneous species (the bulk component of the forest) in forest-covered area are represented by: *Fagus orientalis*, *Castanea sativa*, *Carpinus caucasica*, *Alnus barbata*. Forest stands are mainly of the natural origin. Other ligneous species common for the region are also presented in scattered mode mainly of natural genesis. Other ligneous species characteristic for the region is presented in small fragments and units.

Average annual temperature is 12°C (150-500 m a.s.l.); average temperature of the coldest month (January) is over 2°C. Absolute minimum temperature rarely drops below 10°C, and accumulated temperatures above 10°C amount to 3900-4700°C. This area is characterized by two kinds of red soils: red shallow (*Haplic*

Ferralsols) and red true or podzolic (*Haplic Histosols* or *Rodic Acrisols*).

500-1100 m a.s.l is distinguished by moderately cold winter with deep but unsteady snow cover; warm, long-lasting summer with abundant precipitation (> 2500 mm); average annual temperature is 10-11°C; absolute minimum temperature drops to -10-12°C (rarely to -16°C); duration of the growing season is 6,5-7,5 months. This area is mainly represented by yellow-brown forest soils (*Ocsic Cambisols*) and rusty brown soil - brown forest shallow (*Distric Cambisols*).

At 1100-1763 m a.s.l high relative air humidity (80-81%) and abundant precipitation (up to 4000 mm per annum) are typical. Average annual temperature is +8.5-9°C, average temperature of the hottest month (August) - +15-15.5°C, temperature of the coldest month (January) - +0.5°C, absolute minimum -16-17°C. Duration of a growing season – 5-6,5 months. This area is characterized by rusty brown soil - brown forest shallow (*Distric Cambisols*). Hypsometrically, forest vegetation is arranged in the following way:

1000-500 (600) m: mixed broad-leaved Colchis forests
 500(600)-1000(1200) m: chestnut tree belt
 1000(1200)-1600(1800) m: beech belt

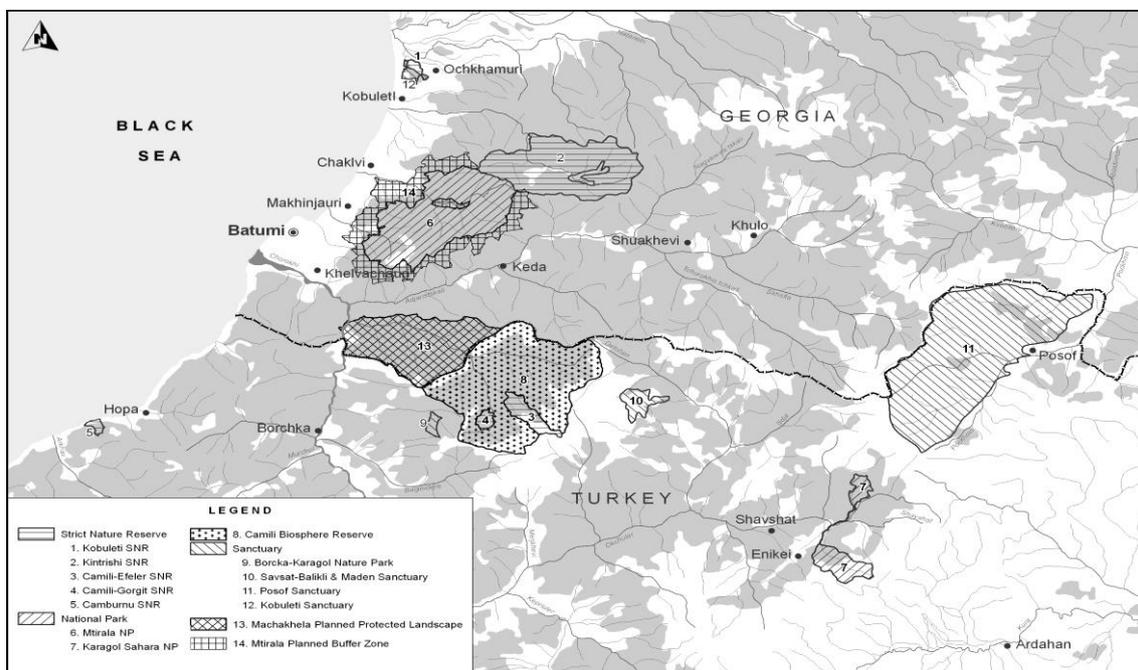


Figure 1. Current and planned conservation territories of Ajara – Savsheti florist region (created by G. Beruchashvili - WWF Caucasus office)

Materials and Methods:

The materials of this study are some 523 vascular plant specimens collected from Mtirala National Park Area between 2008 and 2012. At least one sample for each taxon was prepared by herbarium techniques (Skvortsov, 1977) and kept at the Batumi Botanical Garden Herbarium. These specimens were mainly identified using the Key of Plants Ajara (Dmitrieva, 1990); Flora of Georgia (Ketzkhoveli & Gagnidze, 1971-2001); The herbarium of the Batumi Botanical Garden was used to check the

specimens. The floristic elements are listed in the Appendix (Takhtajan, 1978). All taxa in the floristic list are given according to the order in the Flora of Georgia (Ketzkhoveli & Gagnidze, 1971-2001). Latin names of the plants are given according to Czerepanov (1995). Threatened categories are proposed for the endemic and some non-endemic taxa according to IUCN risk categories (Memiadze 2005; IUCN, 2001).

Results and Discussion:

After the inventory of the flora conducted at the Mtirala National Park it was stated that it is represented by 523 species comprised in 307 genera of 108 families. Dispersion of the taxa into larger taxonomic groups (Table 1.).

The richest families in terms of number of taxa were Asteraceae-66, Poaceae-35, Fabaceae-30, Rosaceae-28, Lamiaceae-27, Brassicaceae-26, Scrophyllariaceae-22, Apiaceae-21, Boraginaceae-16 and Caryophyllaceae-13. It constitutes 54, 4% of the entire flora.

The richest genera in terms of number of taxa were: Trifolium-9, Polygonum-7, Rubus -7,

Epilobium-6, Hypericum-6, Rumex-5, Stachys-5, Vicia-5, Geranium -5, Viola-5 and Veroniva-5.

Diversity, quantity and interrelation of life forms are given special significance for the flora analysis. It expresses the biological specter. The flora of the Park comprises woody/ligneous (trees, tree-shrubs, shrubs, lianas) as well as herbaceous species. Quantitative indices of the life forms are represented in the following way: trees – 32; shrubs – 41; lianas – 5; perennial herbaceous plants/herbs – 267; annual herbaceous plants – 116; biennial herbaceous plants - 36 (Figure 2.)

Table 1. Dispersion of Taxa into Large Taxonomic Groups

Taxonomical Groups	Families	Genera	Species/Subsp/Var
Pteridophyta	13	16	25
Spermatophyta	93	289	496
Gymnospermae	1	1	1
Angiospermae	92	289	496
Dicotyledones	77	243	429
Monocotyledones	16	46	67
Total	108	307	522

According to the life-forms the entire floristic composition of the Mtirala National Park 78 species (14, 9%) are woody species. It is quite a high index for phanerophytes. As early as in 1935 Golitsin (Golitsin, 1939) pointed to this peculiar feature of the Ajara coastline. The ligneous plants of the Mtirala National Park are interesting not only by the number of species. Though they considerably lack behind in number with the herbs, they are still greatly spread and dominants. The woody plants are distinguished by the bio-ecological type as well. Majority of them are the elements of mesophile

flora among which about 20 species are evergreen ones.

There are 444 herbaceous plants (80, 26%), among which 116 are annuals (22, 2%), 36 are biennials (6, 8%) and 292 are perennials (55, 9%). Thus, the perennial herbs are represented with the highest percentage in the life-forms. However, the dominant and background-serving species are still the woody/ligneous ones.

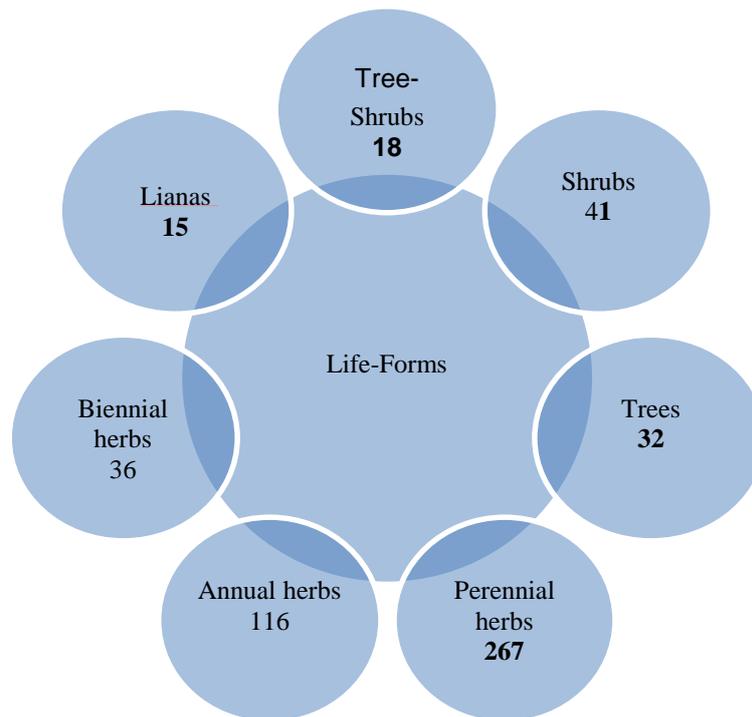


Figure 2. The Vascular Flora Life Form of Mtirala National Park

The geographical spectrum of the floristic species of the Mtirala National Park is quite diverse too (46, 43% of the floristic composition is comprised by holarctic kingdom in which European element is distinguished by the biggest number of species (71) comprising 13, 65% of the entire floristic composition). From the old Mediterranean sub-kingdom the

highest number is represented by the Mediterranean species (82), that is 15, 7% of the entire floristic composition. Colchis element is also distinguished, represented by 41 species and comprising 7, 9%. The ratio of geo-elements of the floristic composition of the Park is well seen in Table 2.

Table 2. Geographical Elements of the Flora at Mtirala National Park

Area Type	Area Class	Number of Species	%
Holarctic	Holarctic	24	
	Boreal	16	
	Palaearctic	63	
	European	71	
	Euro-Siberian	22	
	Eurasian	44	
Total		240	46,43
Ancient Mediterranean	Mediterranean	82	
	Colchis	41	
	Caucasian	26	
	Euxinus	25	
	Colchis-Hyrcanian	3	
	Caucasus-Asia Minor	9	
Total		186	35,63
Other Geographical Elements			
Total		96	18,3

Colchis elements comprise the main bulk of the flora composition in Mtirala National Park. They are represented not only by diversity of species but great diversity of life-forms as well.

Together with the element of ancient Mediterranean flora, the Colchis element creates permanent floristic composition and particular original environment with original

associations. Typical example is formation „Shkeriani“. It is mainly represented by evergreen shrubs: *Rhododendron ponticum*,

Rhododendron ungeronii, *Ilex colchica*, *Laurocerasus officinalis*, etc.

Table 3. Endemic species of Mtirala National Park

Endemism	List of Endemic Species
Ajarian	<i>Ficaria grandiflora</i> (F.popovii), <i>Ranunculus ampelophyllus</i> var. <i>adzharica</i>
Ajara-Lazetian	<i>Rhododendron ungeronii</i> , <i>Primula megasaefolia</i> , <i>Cyclamen adzharicum</i> , <i>Epigaea gaultherioides</i>
Colchis	<i>Heracleum cyclocarpum</i> , <i>Aristolochia pontica</i> , <i>Anthemis woronowii</i> , <i>Cirsium imereticum</i> , <i>Echinops colchicus</i> , <i>Hieracium adjarianum</i> , <i>Galanthus krassnovii</i> , <i>Betula medwedewii</i> , <i>Myosotis lazica</i> , <i>Buxus colchica</i> , <i>Thelycrania koenigii</i> , <i>Euphorbia pontica</i> , <i>Vicia antiqua</i> , <i>Quercus pontica</i> , <i>Ficus carica</i> , <i>Paeonia macrophylla</i> , <i>Rubus caucasicus</i> , <i>Ornithogalum woronowii</i> , <i>Iris lazica</i>
Georgian	<i>Symphytum grandiflorum</i> , <i>Symphytum asperum</i> , <i>Ranunculus bushei</i> , <i>Rubus woronowii</i>
Caucasian	<i>Heracleum sosnowskyi</i> , <i>Solidago virgaurea</i> , <i>Paracynoglossum glochidiatum</i> , <i>Pachyphragma macrophyllum</i> , <i>Gadellia lactiflora</i> , <i>Euonymus leiophloea</i> , <i>Chamaecytisus hirsutissimus</i> , <i>Alcea transcaucasica</i> , <i>Polygala caucasica</i> , <i>Helleborus caucasicus</i> , <i>Ranunculus grandiflorus</i> , <i>Pyrus caucasica</i> , <i>Salix caucasica</i> , <i>Digitalis schischkinii</i> , <i>Melampyrum caucasicum</i> , <i>Galanthus woronowii</i> , <i>Inula magnifica</i> , <i>Senecio propinquus</i> , <i>Senecio pandurifolius</i> , <i>Lapsana pinnatisecta</i> , <i>Symphytum caucasicum</i> , <i>Paeonia caucasica</i>

In the National Park out of 51 endemic species 22 species are Caucasian, 19 – Colchis, 4 – Georgian, 4 – Ajara-Lazetian, 2 – Ajarian (Table 3) (Memiadze, 2005).

14 species are protected at the Mtirala National Park under the Georgian „Red List“ (66, 7% of the entire „Red List“ of Georgia).

46 species of the Caucasus „Red List“ (24, 8% of the entire Caucasus „Red List“ from Ajara). 6 species on the Park territory are protected under the IUCN „Red List“.

3 species of plants - *Cyclamen coum*, *Galanthus krasnovii*, *G. woronowii* – are protected under the CITES list of wild flora and fauna (Table 4).

Table 4. Rare and endangered species of Mtirala National Park

Conservation status	List of Species
Georgian Red List (2006 data)	<i>Betula medwedewii</i> (VU); <i>Buxus colchica</i> (VU); <i>Castanea sativa</i> (VU); <i>Epigaea gaultherioides</i> (VU); <i>Juglans regia</i> (VU); <i>Laurus nobilis</i> ; <i>Osmanthus decorus</i> (VU); <i>Pterocarya pterocarpa</i> (VU); <i>Quercus pontica</i> (VU); <i>Rhododendron smirnowii</i> (VU); <i>Rhododendron ungeronii</i> (VU); <i>Staphylea colchica</i> (VU); <i>Taxus baccata</i> (VU); <i>Ulmus glabra</i> (VU).
Caucasus Red List (2012 data)	<i>Dryopteris oreades</i> (LC), <i>Heracleum cyclocarpum</i> (LC), <i>Heracleum sosnowskyi</i> (NE), <i>Peucedanum caucasicum</i> (NE), <i>Peucedanum longifolium</i> (NE), <i>Hedera helix</i> (NE), <i>Anthemis woronowii</i> (NE), <i>Arctium lappa</i> (NE), <i>Cirsium imereticum</i> (LC), <i>Inula magnifica</i> (NE), <i>Epimedium pubigerum</i> (NT), <i>Alnus barbata</i> (NE), <i>Alnus glutinosa</i> (NE), <i>Betula medwedewii</i> (VU), <i>Symphytum grandiflorum</i> (NE), <i>Hesperis adzharica</i> (NE), <i>Pachyphragma macrophyllum</i> (NE), <i>Gadellia lactiflora</i> (NE), <i>Melandrium balansae</i> (NE), <i>Euonymus leiophloea</i> (NE), <i>Swida koenigii</i> (VU), <i>Sedum caucasicum</i> (NE), <i>Rhododendron ungeronii</i> (VU), <i>Euphorbia stricta</i> (NE), <i>Chamaecytisus hirsutissimus</i> (NE), <i>Psoralea acaulis</i> (NE), <i>Vicia antiqua</i> (NE), <i>Quercus pontica</i> (VU), <i>Quercus imeretina</i> (VU), <i>Lamium album</i> (NE), <i>Alcea transcaucasica</i> (NT), <i>Paeonia caucasica</i> (NE), <i>Paeonia macrophylla</i> (NE), <i>Fraxinus excelsior</i> (NE), <i>Helleborus caucasicus</i> (NE), <i>Rubus buschi</i> (NE), <i>Rubus caesius</i> (NE), <i>Digitalis schischkinii</i> (NE), <i>Scrophularia macrobotrys</i> (NE), <i>Daphne glomerata</i> (NE), <i>Tilia begoniifolia</i> (NE), <i>Galanthus woronowii</i> (NE), <i>Polygonatum glaberrimum</i> (NE), <i>Carex sylvatica</i> (NE), <i>Lilium szovtsianum</i> (NE)
IUCN Red List	<i>Taxus baccata</i> (Lower Risk/least concern ver 2.3 (needs updating)); <i>Alnus glutinosa</i> (Least Concern ver 3.1); <i>Corylus avellana</i> (Least Concern ver 3.1); <i>Buxus colchica</i> (Lower Risk/near threatened ver 2.3 (needs updating)); <i>Juglans regia</i> (Near Threatened ver 3.1 Pop. trend: decreasing), <i>Diospyros lotus</i> (Least Concern ver 3.1)

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