

*Botany*

# Endemics of the Flora of Khvamli and Nakerala Ridges

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(Presented by Academy Member Gia Nakhutsrishvili)

Our research area includes the western part of the Racha Ridge, particularly Tavshava, Nakerala, Satsalike. The vegetation of Khvamli is represented as: the massif from the base to 1000 m covered with secondary forest, often with shrubs. From 1500 meters above sea level the forest takes on a more mesophilic character. The upper border of the forest in this part of the massif is located at an altitude of 1600-1700 meters above sea level. Here the forests are represented by scarcity of beech (*Fagus orientalis*), spruce (*Picea orientalis*), pines (*Pinus spp.*) and mountain maple (*Acer trautvetteri*). In the subalpine vegetation above the forest, in some cases separate sections of the forest are preserved, which are represented by bushes, secondary high herbage of the meadow. Peculiar rock plants are common in the subalpine belt. Separate sections of the forest are preserved here on steep and rocky places at an altitude of 1800-1900 m above sea level. The forest complexes of the Khvamli ridge are made up of 236 species, which are included in 154 genera, the meadow complexes are made up of 181 species, the flora complexes of rocks and sloughs are made up of 79 species, tall herbaceous complexes include 16 species, 18 species are found in ruderal areas. Endemic species are 97, of which Caucasian endemics are 60, endemic of Georgia – 27, Imeretian – 5, from Racha-Lechkhumi – 5. © 2024 Bull. Georg. Natl. Acad. Sci.

Khvamli, Nakerala, vegetation, endemic

The research area belongs to the botanical and geographical region of Colchis. Khvamli mountain is included in the limestone forest and alpine sub-provinces of the Western Transcaucasia [1,2]. E. Sokhadze [3] includes it in the limestones district of the mountain sub-province of north Colchis in Colchis province. The Khvamli massif is considered in Racha-Lechkhumi district of the West Transcaucasia limestone subprovince of the Kolkheti province [4]. Morphologically, the

surface of Khvamli is a plateau divided by karst erosion processes. Its topographic appearance is determined by the complex of funnels, wells and springs flowing underneath, the depth of which is mostly 40-50 m, and the length is several tens of meters. The mentioned karst formations give Khvamli a wave-shaped riddled surface. The watersheds between abysses and untrodden paths are characterized by convex ridges and are almost devoid of flat surfaces. At an altitude of 1700

meters there is a "foot-ridge ice cellar", in which the snow shoveled in winter remains throughout the summer, the temperature here is below zero; there are icicles and sticks inside. The western side of Khvamli consists of two-step steep rocks, this side is impassable, it has only one entrance, which starts at the bottom of the first step, the steps gradually rise in the west direction. The lower northern or upper cretaceous cuesta is less karstic. The limestone ridge of Nakerala is separated into a separate botanical geographical area – under the name of Nakerala district. The Nakerala range is separated as an independent sub-district within the limits of the limestone range of Racha and Lechkhumi district [4]. The latter includes: 1. Lechkhumi-Racha low-mountainous sub-district; 2. Nakerala sub-district; 3. Satsalike-Khikhata-Leknari sub-district; 4. Shkmeri sub-district. In the Nakerala sub-district, the authors combine the Nakerala Ridge, the Tashava massif, and the Shaori Basin. Our research area includes the western part of Racha Ridge, particularly, Tavshava, Nakerala, Satsalike. The south-eastern and southern slopes of the Nakerala Ridge are completely included in the flora of Imereti. The entire ridge is located in the forest belt, only the forestless slope of its western part is represented by alpine elements (Mount Giorgi), alpine elements can also be found in the vicinity of Tskhrajvari. Vertical belting is well preserved in the arrangement of vegetation of the Nakerala ridge.

The climatic regime for the upper belt of the Khvamli limestone massif is peculiar, which is related to the condensation of moisture brought from the Black Sea by the southwest winds. This explains the frequent thick fog here.

## Research Method and Results

The vegetation of Khvamli is represented as follows: the massif from the base to 1000 m is covered with secondary forest, often with shrubs. The main constituent species of the forest are: *Quercus pontica*, *Carpinus caucasica*, *Carpinus*

*orientalis*, *Acer trautvetteri*, *Corylus avellana*, *Crataegus pentagyna*, *Rubus caucasicus*, *Lonicera caprifolia*, *Staphylea colchica*. On the southern slopes, there are oak forests with some beeches. Beech (*Fagus orientalis*) can be found above 1000m above sea level, the role of which gradually increases with height. Spruce (*Picea orientalis*) and fir-tree (*Abies nordmanniana*) can be found in the forest from about 1300 meters above sea level, and at 1400-1500 meters they form high-stemmed beech-coniferous forests. *Fagus orientalis*, *Carpinus caucasica*, *Picea orientalis*, *Abies nordmanniana*, *Ulmus elliptica* prevail in the forest up to 1500 meters above sea level. *Corylus avellana*, *Daphne glomerata*, *Laurocerasus officinalis*, *Ilex colchica*, *Rubus caucasicus* are typical for sub-forest. Among the ferns in this belt, *Pteridium tauricum* and *Dryopteris filix-mas* occur. There are no *Castanea sativa*, *Rhododendron ponticum*. From 1500 meters above sea level the forest takes on a more mesophilic character, *Fagus orientalis* (*Picea orientalis*) prevails among the woody plants here, *Pinus sylvestris*, *Ulmus elliptica*, *Tilia begoniifolia* are less involved. *Ilex colchica*, *Rhamnus imeretina*, *Laurocerasus officinalis* can be found in the sparse forests. Ferns and *Paeonia macrophylla* are typical in the windows of sprouts. There are more ferns in this belt than in the lower one. The upper border of the forest in this part of the massif is located at an altitude of 1600-1700 meters above sea level. Here the forests are represented by scarcity of beech (*Fagus orientalis*), spruce (*Picea orientalis*), pines (*Pinus spp.*) and mountain maple (*Acer trautvetteri*). *Rhamnus imeretina*, *Ribes nigrum* and *Daphne glomerata* can be found in the undergrowth mixed with *Taxus baccata* and *Juniperus depressa*. In the subalpine vegetation above the forest, in some cases separate sections of the forest are preserved, which are represented by bushes, secondary high herbage of the meadow. Peculiar rock plants are common in the subalpine belt. Separate sections of the forest are preserved here on

steep and rocky places at an altitude of 1800-1900 m. above sea level. Here, the woody plants of the forest include: *Fagus orientalis*, *Pinus sylvestris* and *Picea orientalis*. *Betula litwinowii* and *Acer trautvetteri* are less common, and the most common shrubs are: *Daphne mezereum*, *Laurocerasus officinalis*, *Frangula alnus* and *Vaccinium myrtillus*. Less: *Juniperus oblonga*, *Corylus avellana*, *Crataegus pentagina* [5].

The forest complexes of the Khvamli ridge are made up of 236 species, which are included in 154 genera, the meadow complexes are made up of 181 species, the flora complexes of rocks and sloughs are made up of 79 species, tall herbaceous complexes include 16 species, 18 species are found in ruderal areas.

There are 97 endemic species of which Caucasian endemics are 60, endemic of Georgia-27, Imeretian-5, from Racha-Lechkhumi -5.

**Table. Endemic species of the Caucasus [6-9]**

Caucasian endemics	
Familia	Species
Campanulaceae	<i>Sympfyadra pendula</i> (Bieb) A. DC.
Capparaceae	<i>Cleome daghestanica</i> (Rupr) Tzelev
Cariophyllaceae	<i>Dianthus imereticus</i> (Rupr) Schischk.
Compisitae	<i>Cirsium buschianum</i> Kharadze <i>Crepis caucasica</i> C.A. Mey. <i>Erigeron caucasicus</i> Steven <i>Hieracium pannoniciforme</i> Litv. & Zahn <i>Inula magnifica</i> Lipsky <i>Omaltheca caucasica</i> Leskov ex Grossh. <i>Senecio grandidentatus</i> Lebed. <i>Senecio massagetovii</i> Schischk. <i>Senecio pandurifolius</i> Harv. <i>Senecio propinquus</i> Schischk. <i>Senecio rombifolius</i> Bolle
Corilaceae	<i>Corylus iberica</i> Wittm. Ex Bobrov
Dipsacaceae	<i>Cephalaria gigentae</i> (Lebed.) Bobrov
Cruciferae	<i>Alliaria brachycarpa</i> M. Bieb.
Ericaceae	<i>Arctostaphylos caucasica</i> Lipsch.
Euphobriaceae	<i>Euphobia macroceras</i> Fisch.& C.A.Mey.
Heleboraceae	<i>Aconitum nasutum</i> Rchb. <i>Aquilegia colchica</i> Kem.-Nath. <i>Helleborus caucasicus</i> A. Braun
Leguminosae	<i>Anthyllis grossheimii</i> Chinth. <i>Lotus caucasicus</i> Kuprian. <i>Medicago glutinosa</i> M. Bieb.

Orobanchaceae	<i>Orobanche gamosepala</i> Reut.
Paeniaceae	<i>Paeonia macrophylla</i> Lomak. <i>Paeonia caucasica</i> Schipcz. <i>Paeonia Wittmanniana</i> Hartwiss ex Lindl.
Polygonaceae	<i>Polygonum panjutinii</i> Kharkev.
Ranunculaceae	<i>Ranunculus acutilobus</i> Lebed. <i>Ranunculus makaschvilii</i> Kem.-Nath.
Primulaceae	<i>Primula meyeri</i> Rupr.
Rosaceae	<i>Potentilla caucasica</i> Yuz. <i>Pyrus caucasicus</i> Fed. <i>Sorbus caucasicus</i> Var.yaltirikii Gökşin <i>Sorbus caucasigena</i> Kom. <i>Sorbus colchica</i> Zinserl. <i>Woronowia speciosa</i> Yuz.
Rubiaceae	<i>Galium valantioides</i> M. Bieb.
Salicaceae	<i>Salix kanbekensis</i> A. K. Skvortsov
Scrophulariaceae	<i>Digitalis ciliate</i> Trautv. <i>Digitalis Schischkinii</i> K. V. Ivaniana <i>Euphrasia kemulariae</i> Yuz. <i>Pedicularis caucasica</i> M. Bieb. <i>Scrophularia divaricata</i> Lebed. <i>Scrophularia laterifolia</i> Traut.
Thymelaeaceae	<i>Daphne pseudosericea</i> Pobed.
Umbelliferae	<i>Angelica tatianae</i> Bordz. <i>Chaerophyllum humile</i> Stevev <i>Chaerophyllum roseum</i> M. Bieb. <i>Heracleum lescovii</i> Grossh.
Valerianaceae	<i>Valeriana colchica</i> Utkin <i>Valeriana tiliifolia</i> Troickij
Alliaceae	<i>Allium ruprechtii</i> Boiss.
Amaryllidaceae	<i>Galanthus platiphyllus</i> Traub & Moldenke
Asparagaceae	<i>Ruscus colchicus</i> Yeo
Iridaceae	<i>Crocus scharojanii</i> Rupr.
Liliaceae	<i>Convallaria transcaucasica</i> Utkin ex Grossh. <i>Erytronium caucasicum</i> Woronow
Georgian endemics	
Familia	Familia
Campanulaceae	<i>Campanula dzaaku</i> Albov <i>Campanula fonderwisii</i> Albov
Compositae	<i>Centaurea bagdadensis</i> Woronov <i>Helichrisum polyphyllum</i> Lebed. <i>Hieracium latpariense</i> (Peter) Üksip <i>Petasites fominii</i> Borsz. <i>Psephelus colchicus</i> Sosn.
Colylaceae	<i>Corylus imerethica</i> Kem.-Nath.
Fagacea	<i>Quercus imeretina</i> Steven ex Woronow
Gentianaceae	<i>Gentiana kolakovskiyi</i> Doluch.
Helleboraceae	<i>Hellebores abchasicus</i> A. Braun
labiatae	<i>Scutellaria helenae</i> Album
Leguminosae	<i>Astragalus kemulariae</i> Grossh.
Paeniaceae	<i>Paeonia ruprechtiana</i> Kem.-Nath. <i>Paeonia steveniana</i> Kem.-Nath.
Polygalaceae	<i>Polygala albowii</i> Kem.-Nath.
Rhamnaceae	<i>Rhamnus cordata</i> Medwedew

Rosaceae	<i>Rubus moschus</i> Juz. <i>Rubus nakeralicus</i> Sanadze <i>Rubus platyphyllus</i> K. Koch.
Rubiaceae	<i>Asperula kemularia</i> Manden.
Scrophulariaceae	<i>Linaria imeretica</i> Kem.-Nath.
Umbelliferae	<i>Astrentia colchica</i> Albov <i>Heracleum sommieri</i> Manden. <i>Polylophium panjutinii</i> Manden.& Schischk.
Alliaceae	<i>Allium pseudostrictum</i> Albov
Liliaceae	<i>Scilla winogradowii</i> Sosn.
<b>Imeretian endemics</b>	
<b>Familia</b>	<b>Species</b>
Amaryllidaceae	<i>Galanthus schaoricus</i> Kem.-Nath.
Campanulaceae	<i>Campanula irinae</i> A.I. Kuth.
leguminosae	<i>Genista sachokiana</i> A.I. Kuth.
Rosaceae	<i>Potentilla kemulariae</i> Kappell & A.I. Kuth.
Scrophulariaceae	<i>Euphrasia kemulariae</i> Yuz.
<b>Racha-Lechkhumi endemics</b>	
<b>Familia</b>	<b>Species</b>
Campanulaceae	<i>Campanula letschchumensis</i> Kem.- Nath. <i>Campanula radchensis</i> Kharadze <i>Scabiosa colchica</i> Steven

Dipsacaceae	<i>Scabiosa letschchumensis</i> Kem.- Nath.
Liliaceae	<i>Muscari alpanicum</i> Schchian

## Conclusion

Endemic species are 15, 27% of the flora, of which Caucasian endemics are 9.28% of the entire flora, Imeretian – 0.74%, from Racha-Lechkhumi – 0.74%, out of the endemic species, Caucasian endemics comprise 60.78% of all the endemics, endemics of Georgia are – 29.31%, Imeretian – 4.9%, from Racha-Lechkhumi – 4.9%.

The research conducted on the vegetation of the limestone massif of the Khvamli mountain is important for the study of the systematics, ecology, and plant diversity of western Georgia's phytocenoses. The collected material is processed at Kutaisi Akaki Tsereteli University and is stored in the herbarium of the same university.

## ბოტანიკა

# ხვამლისა და ნაქერალას ქედების ფლორის ენდემები

## ნ. ძოჭენიძე

აკაკი წერეთლის სახელმწიფო უნივერსიტეტი, ზუსტ და საბუნებისმეტყველო მეცნიერებათა ფაკულტეტი, ბიოლოგიის დეპარტამენტი, ქუთაისი, საქართველო

(წარმოდგენილია აკადემიის წევრის გ. ნახუცრიშვილის მიერ)

ნაშრომში წარმოდგენილია საკვლევი ტერიტორია – რაჭის ქედის დასავლეთი ნაწილი, კერძოდ: თავშავა, ნაქერალა, საწალიკე. კლიმატური რეჟიმი ხვამლის კირქვიანი მასივის ზემო სარტყლისათვის თავისებურია, რაც დაკავშირებულია ტენის კონდენსაციასთან, რომელიც

მოტანილია შავი ზღვიდან სამხრეთ დასავლეთის ქარებით. ზღვის დონიდან 1000 მ-ის ზემოთ გვხვდება *Fagus orientalis*, რომლის როლი სიმალესთან დაკავშირებით თანდათანობით იზრდება. ნაძვი და სოჭი ტყის შემადგენლობაში გვხვდება დაახლოებით ზღვის დონიდან 1300 მეტრიდან, ხოლო 1400-1500 მეტრზე ისინი ქმნიან მაღალღეროვან წიფლნარ-მუქწიწვოვან ტყეებს. ზ. დ. 1500 მეტრიდან ტყეები უფრო მეზოფილური ხასიათის გვხვდება. ტყის ზემო საზღვარი მასივის ამ ნაწილში მდებარეობს 1600-1700 მ სიმალეზე ზღვის დონიდან. ტყის ზემოთ მდებარე მცენარეულობა რიგ შემთხვევაში შემორჩენილია ტყის ცალკეული მონაკვეთებით, რაც წარმოდგენილია ბუჩქებით, მდელოს მეორეული მაღალბალახეულობით. სუბალპურ სარტყელში გავრცელებულია თავისებური კლდის მცენარეები. ტყის ცალკეული მონაკვეთები აქ შემორჩენილია ციცაბო და კლდოვან ადგილებზე 1800-1900 მ სიმალეზე ზღვის დონიდან. ხვამლისა და ნაქერალას ქედების ტყის კომპლექსებს ქმნის 236 სახეობა, რომელიც გაერთიანებულია 154 გვარში, მდელოს კომპლექსებს ქმნის 181 სახეობა, კლდეებისა და ნაშაღორღიანების ფლორის კომპლექსებს - 79 სახეობა, მაღალბალახეულის კომპლექსებში შედის 16, რუდერალურ ადგილებში გავრცელებულია 18 სახეობა. ნაქერალას და ხვამლის ფლორაში სულ 97 სახეობის ენდემური მცენარეა, მათ შორის კავკასიის ენდემია - 60 სახეობა, საქართველოსი - 27, იმერეთის - 5, რაჭა-ლეჩხუმის - 5 სახეობა.

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