



Full Length Research Article

Variety of plants of Chorokhi Delta of Adjara Floristic District, Georgia

Medea Beridze¹, Natela Varshanidze², Nazi Turmanidze³, Ketevan Dolidze⁴, Nana Zarnadze⁵, Gia Bolkvadze⁶, Jana Tchitanava⁷ and Nino Manvelidze⁸

¹ Doctorate Student, Biology Department, Batumi Shota Rustaveli State University, Georgia.

² Associate Professor, Biology Department, Batumi Shota Rustaveli State University, ³ Associate Professor, Biology Department, Batumi Shota Rustaveli State University, Georgia.

⁴ Professor, Biology Department, Batumi Shota Rustaveli State University, Georgia.

⁵ Associate Professor, Biology Department, Batumi Shota Rustaveli State University, Georgia.

⁶ Scientist, Doctor of Biology, Batumi Shota Rustaveli State University, Georgia.

⁷ Assistant Professor, Biology Department, Batumi Shota Rustaveli State University, Georgia.

⁸ Doctorate Student, Batumi Botanical Garden, Georgia.

ARTICLE INFORMATION

Corresponding Author:

Medea Beridze

Article history:

Received: 26-08-2020

Revised: 06-09-2020

Accepted: 14-09-2020

Published: 18-09-2020

Key words:

Chorokhi Delta, flora, habitat, endemic, relict.

ABSTRACT

The research objective was the floristic analysis, systematic structure and vital forms of plant species common in the Chorokhi Delta of the Adjara floristic district habitats: seaside sand, coastal sand dunes, freshwater swamps, swamps, woodlands, grassy slopes, cliffs, rocky slopes, roadside. The above mentioned area is the Georgian-Turkish cross-border zone, due to which it is the subject to strong anthropogenic impact. The flora of the Chorokhi Delta is represented by 271 species, which are united in 157 genera of 77 families. According to the systematic structure, 3 species belong to horsetails, 12 species belong to ferns; 254 species to angiosperms, among them 217 species are dicotyledonous, while 40 ones are monocotyledonous. According to the living forms: there are 244 species of grass, 9 species of trees, 10 species of shrubs, 6 species of lianas. 5 species are extinct, while 26 species are endangered. 35 species are endemic, including 3 species of the Caucasus endemy, 10 species of Georgia endemy, 12 species of Kolkheti endemy, 6 species of Adjara Lazeti endemy, 4 species of Adjara endemy. 44 species are relict; most of the relics are of Colchian origin. 39 species are adventive, while 4 species are invasive. The field surveys were conducted in 2013-2019 by using the route expedition method. Plant species systematic status was granted by using the systematic nomenclature www.theplantlist.org. The Macy, Land, and Braun-Blanquet methods have been used to study extinct and endangered plants (Mace, 1991; Braun-Blanquet, 1965).

Introduction

The Chorokhi Delta is an integral part of Adjara (southern Kolkheti), located in the southwestern part of Georgia, its area is 80 km², the hypsometric boundaries of the territory are 0-200 m.MSL (Nizharadze, 1961). The territory of the Chorokhi Delta includes the Black Sea coast from the Georgian-Turkish state border to the confluence of the Korolistkali River. (<https://ka.wikipedia.org/wiki/Delta>). The relief of the Chorokhi Delta is represented by the Kakhberi lowlands and nearby hills. The Chorokhi Delta relief formation was impacted by the Chorokhi River, the Black Sea, coastal winds and some erosion processes (Maruashvili 1964). Due to its direct proximity to the Black Sea, the Chorokhi Delta is characterized by a humid subtropical climate, abundance of atmospheric precipitation, humidity and the prevalence of sea winds (Mgeladze 2018). We can find 4 types of soils in the Chorokhi Delta: lowland marshy soils, alluvial soils, red soils and yellow loam soils (Palavandishvili 2004). There are 9 habitats spread in the

Chorokhi Delta: seaside sand, coastal sand dunes, freshwater swamps, swamps, woodlands, grassy slopes, cliffs, rocky slopes, roadside.

The habitats of the Chorokhi Delta are distinguished by the special diversity and originality of the flora, which is due to its historical past and geographical location. Seaside Adjara, which consists of the Chorokhi Delta, is separated from highland Adjara by the Kobuleti-Chakvi ridge. Due to its close proximity to the Black Sea, which is a kind of thermoregulator of the heat, the flora of the Chorokhi Delta was not affected by the Tertiary and Quaternary glaciation, that is why we can still find the plant groups formed in the Tertiary, floristic complexes rich in relict and endemic species, Colchian elements of vegetation with valuable wood resources, medicinal and other valuable plant resources, many of which were lost as a result of the extraction of plant resources and the arrangement of infrastructure (Manvelidze 2008). There are 271 plant species in

9 habitats of the Chorokhi Delta, which are united in 157 genera of 77 families. Among them 3 species belong to horsetails, 12 species belong to ferns; 254 species to angiosperms, among them 217 species are dicotyledonous, 40 species are monocotyledonous. There are 244 species of grasses, including 23 annuals and 221 perennials. There are 19 species of timber, including 9 species of trees, 10 species of shrubs and 6 species of lianas. The families' rich in genera are: *Compositae* - 26 species, *Poaceae* - 18 species, *Caryophyllaceae*, *Lamiaceae* - 13 species, *Rosaceae* - 12 species, *Apiaceae*, *Fabaceae*, *Ranunculaceae* - 10 species, *Scrophulariaceae* - 9 species, *Brassicaceae* - 6 species. The species-rich genera are: *Vicia*, *Carex*, *Geranium*, *Potentilla*, *Saxifraga*, *Veronica*, *Hieracium*, *Hypericum*, *Cardamine*, *Festuca*. The Chorokhi Delta is rich in endemism indicator. Endemic flora is represented by 35 species, including 3 species of the Caucasus endemy, 10 species of Georgia endemy, 12 species of Kolkheti endemy, 6 species of Adjara-Lazeti endemy, 4 species of Adjara endemy. The Chorokhi Delta area is the Georgian-Turkish cross-border zone and a recreational area, where infrastructure is constantly evolving, roads and beaches are being improved, hotels and entertainment centers are being built, which has led to fragmentation of plant areas, endangering local vegetation. Many species became extinct, while many have become endangered. Due to the drying up of ponds and swamps in the Kakhbari lowlands, 5 species became extinct in these habitats: *Marsillea quadrifolia*, *Asparagus littoralis*, *Nimphaea colchica*, *Trapa colchica*, *Trapa Maleevii*. 26 endangered species grow in different habitats of Chorokhi Delta: *Anogramma leptophylla*, *Adiantum capillus veneris*, *Taxus baccata*, *Althea officinalis*, *Buxus colchica*, *Celtis australis*, *Cyclamen adzharicum*, *Diospiros lotus*, *Laurus Galabus*, *Laurus galabi*, *Laurus Galahus*, *Eringium giganteum*, *Helleborus caucasicus*, *Hippopae rhamnoides*, *Nimphaea colchica*, *Pachyphragmamacrophyllum*, *Primula megasaefolia*, *P. sibtorfii*, *Pterocarya pterocarpa*, *Punica granatum*, *Quercus dchorochensis*, *Staphyllea colchica*, *S. Pinnata* (Memiadze 2003, Makaradze 2015). Among them, 18 species are included in the Georgian Red Book (1982): *Anogramma leptophylla*, *Taxus baccata*, *Buxus colchica*, *Diospiros lotus*, *Hippopae rhamnoides*, *Trapa colchica*, *Trapa Maleevii*, *Nimphaea colchica*, *Staphyllea colchica*, *S. pinnata*, *Ulmus glabra*, *U. Elliptica*, *Castanea sativa*, *Quercus dchorochensis*, *Pterocarya pterocarpa*, *Punica granatum*, *Laurus nobilis*, *Juglans regia*. The Red List of Georgia (www. Red List of Georgia 2006) includes 7 species: *Buxus colchica*, *Castanea sativa*, *Celtis australis*, *Iglans regia*, *Laurus nobilis*, *Pterocarya pterocarpa*, *Staphyllea colchica*. The IUCN Red List includes 7 species: *Taxus baccata*, *Buxus colchica*, *Corylus avellana*, *Diospyros lotus*, *Ficus colchica*, *Juglans regia*, *Pterocarya pterocarpa*, *Punica granatum*, *Vitis vinifera*. There are 44 relict species of the Tertiary period in the habitats of the Chorokhi Delta, most of the relicts are of Colchian origin. Among them 13 trees, 8 shrubs, 4 lianas, 19 species are herbaceous. Among the relicts that are characterized by progressive spread are: *Fagus orientalis*, *Tilia caucasica*, *Cornus australis*, *Diospiros lotus*, *Staphyllea colchica*, *Celtis australis*, *Rhododendron ponticum*, *Ilex colchica*, *Hedera colchica*. 39 species are adventive, adventitious species are mainly settled in ruderal, ruderal-segetal and segetal vegetation. They are mainly cosmopolitan, the species with a high rate of reaction to the environment (Gagnidze 2000). Adventive species include: *Bellis perennis*, *Cardamine hirsuta*, *Geranium rotundifolium*, *Polygonum aviculare*, *Bromopsis variegata*, *Poa annua* and others. 4 species are invasive: *Pueraria hirsuta*,

Robinia pseudoacacia, *Ambrosia artemisiifolia*, *Xantium occidentale* (Davitadze 2001).

Materials and Methods

The research objective was plants common in 9 habitats of Chorokhi Delta. The field surveys were conducted in 2013-2019 by using the route expedition and quadratic method. The Adjara Plant Determinant (Дмитриева, 1990) and the Georgian Plant Determinant (1964; 1969) were used for plant identification. We granted systematic status to the plant by using the systematic nomenclature www. the plant list. org. The methodology proposed by Macy and Land (Mace, 1991) was used to study extinct and endangered plants, and the Braun-Blanquet method (1965) was used to determine the frequency of plant species in each habitat. The endemism and relictivity of plant species were determined using the flora of Georgia (Flora of Georgia).

Result and discussion

According to our research, there are 9 main habitats in the Chorokhi Delta area: seaside sand, coastal sand dunes, freshwater swamps, swamps, woodlands, grassy slopes, cliffs, rocky slopes, roadside. 271 species of plants are distributed in the mentioned habitats, which are united in 77 families and 157 genera (Manvelidze 2008). Among them, 3 species belong to horsetails, 12 species belong to ferns; 254 species to angiosperms, among them 217 species are dicotyledonous, while 40 species are monocotyledonous. There are 244 species of grasses, including 23 annuals and 221 perennials. There are 19 woody species, including 9 species of trees, 10 species of shrubs and 6 species of lianas. Families rich in genera are: *Compositae* - 26 species, *Poaceae* - 18 species, *Caryophyllaceae*, *Lamiaceae* - 13 species, *Rosaceae* - 12 species, *Apiaceae*, *Fabaceae*, *Ranunculaceae* - 10 species, *Scrophulariaceae* - 9 species, *Brassicaceae* - 6 species. As a result of an anthropogenic impact, drying up of ponds and swamps, improvement of beaches, 5 species have become extinct, 26 species are endangered (Memiadze 2003, Makaradze 2015). Among them, 18 species are included in the Georgian Red Book (1982.) The Red List of Georgia (www. Red List of Georgia. 2006) includes 7 species. The IUCN Red List includes 7 species. 35 species are endemic, 44 species belong to the relicts of the Tertiary period. 39 species are adventive, while 4 species are invasive (Davitadze 2001).

Conclusion

There are 9 main habitats in the Chorokhi Delta area: seaside sand, coastal sand dunes, freshwater swamps, swamps, woodlands, grassy slopes, cliffs, rocky slopes, roadside. 271 species of plants are distributed in the mentioned habitats, which are united in 77 families and 157 genera. Among them, 3 species belong to horsetails, 12 species belong to ferns; 254 species to angiosperms, among them 217 species are dicotyledonous, 40 species are monocotyledonous. There are 244 species of grasses, including 23 annuals and 221 perennials. There are 19 species of woody species, including 9 species of trees, 10 species of shrubs and 6 species of lianas. Due to the drying up of lakes and swamps, the improvement of beaches, 5 species have become extinct, 26 species are endangered. 35 species are endemic, among them 3 species are the Caucasus endemy, Georgian endemy - 10 species, Kolkheti endemy - 12 species, Adjara - Lazeti endemy - 6 species, Adjara endemy - 4 species, 44 species are relict, 39 species are adventive, while 4 species are invasive.

References

- Braun blanquet J.B. (1965). Plant Sociology: The Study of Plant Communities. Authorized English Translation of Pflanzensoziologie by J. Braun-Blanquet. Transl., rev. and Ed. by George D. Fuller and Henry S. Conard. Hafner Pub.
- Gagnidze R., Davitadze M. (2000). Local Flora, Adjara, Batumi, p.271
- Gagnidze, R. (2000). Diversity of Georgian flora. Biological and landscape diversity of Georgia. Tbilisi. P. 21-32.
- Davitadze, M. (2001). "Adventurous Flora of Adjara". "Batumi University", Batumi 199.p.
- Dmitrieva, A. (1990). [In Russian], Key to flora of Adjara. Vol. I. Tbilisi: Metsniereba.
- Dmitrieva, A. (1990). [In Russian], Key to flora of Adjara. Vol. II. Tbilisi: Metsniereba.
- Floral area of Adjara (List of wild grown plants species) //AnnalsofAgrarianScience, vol.6, No2, pp.93-16
- Ketskhoveri N., Kharadze A., Gagnidze R. (1971-2003). "Flora of Georgia". 1-13. Tbilisi, Science.
- Mace. G.M. and Lande R. (1991). Assessing extinction threats: toward re-evaluation of IUCN threatened species categories. *Conserv. Bio.* 5.2:148-157.
- Makaradze E., Varshanidze N. (2015). Ajara-Turkey transboundary area rare and endangered species. Instruments for Modelling Black Sea River Basins: Research Proceedings for Guria Region of Georgia. ILMM-BSE Project ENPI Partner Georgia. International Association CIVITAS GEORGICA. Georgia. Pp. 131-133.
- Makaradze E., Varshanidze N. (2015). Biodiversity of rare and endangered species spread on the hills of Adjara. "International Scientific Conference Dedicated to the 80th Anniversary of Batumi Shota Rustaveli State University". Batumi.
- Manvelidze Z., Memiadze N., Kharazishvili D., Varshanidze N. (2008). Diversity of
- Maruashvili L. (1964). Physical Geography of Georgia, Tbilisi.
- Memiadze N., Manvelidze Z., Varshanidze N. (2003). Rare and endangered species of wild flora of coastal Adjara. Volume "Moambe" of the Batumi Botanical Garden of the Georgian Academy of Sciences 32.
- Mgeladze M., Kikava A., Kalandadze B., Khorava S. (2018). Some Peculiarities of Soil Geography and Genesis of Mountain-Forest Zone (on the example of Ajara Region, Georgia). *International Journal of Scientific & Engineering Research* Volume 9, Issue 5, May-2018 1318 ISSN 2229-5518
- Nizharadze, N. (1961). Soviet Adjara (economic and geographical characteristics). Batumi, state Publisher. p. 260.
- Palavandishvili S. (2004). Geography of soils. "Adjara Publishing House" Batumi.
- Plant identification of Georgia. (1964-69). Tbilisi, "Science", T-I-II.
- Red Book of Georgia. (1982). Published by "Soviet Georgia". Tbilisi.
- Varshanidze N. (2013). Species diversity of medicinal plants common in Adjara. Batumi.
- www. "Red List" of Georgia. 2006. [www. the plantlist.org](http://www.theplantlist.org)