

Endemic, relict and rare medicinal plants growing in the Saguramo range

Roza Bidzinashvili ¹, Nino Eradze ², Neli Tskhadadze ² and Tamar Nadiradze ^{3,*}

¹ Medicinal Plants Sector of the National Botanical Garden of Georgia, #1 Botanicuri str., 0114 Tbilisi, Georgia.

² Ethnobotany Department of the National Botanical Garden of Georgia, #1 Botanicuri str., 0114 Tbilisi, Georgia.

³ Department of Agricultural, Natural Sciences and Technologies, Faculty of Agricultural, Natural Sciences and Technologies, Iakob Gogebashvili Telavi State University, #1 Kartuli Universiteti str., 2200 Telavi, Georgia.

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Abstract

In 2016-2020 years, on the basis of monitoring carried out in a number of parts of Saguramo Range in different periods of the year, medicinal plants blooming in early spring, as well as late spring and summer-autumn period were recorded. During the research, endemic, relict, rare and critically endangered plants of Caucasus and Georgia have been revealed, which require appropriate protection and care.

Keywords: Endemic; Relict; Rare; Endangered; Conservation

1. Introduction

The total area of Saguramo Range, located from 550-600 to 1393 meters above sea level, exceeds 5000 ha. The varied relief of the area, the wide amplitude of the exposures and heights of the slopes of the range lead to the diversity of the vegetation.

Xerophyticity of the vegetation cover of the southern slope of Saguramo Range is determined by the existed character of climate factor complex (Here can be found thorny shrubs: Jerusalem thorn - *Paliurus spina-christi*, Spiraea - *Spiraea hypericifolia*, Black buckthorn - *Rhamnus pallasii*, blackthorn - *Prunus spinosa*, Oriental hornbeam - *Carpinus orientalis*, Georgian oak - *Quercus iberica*, Almond - *Amygdalus nana*, and etc.)

Mesophilic nature of vegetation cover of the northern slope indicates the presence of a peculiar microclimate different from the southern slope. Saguramo ridge is a “forest island of Kolkheti” represented by the relicts of tertiary age of Kolkhety Type.

Lower slopes of the Saguramo Range are covered with oak and hornbeam forests, here are numerous hawthorn species - *Crataegus kyrtostyla*, *C. microphylla*, *C. pentagyna*, wild pear - *Pyrus caucasica*, crab apple - *Malus orientalis*, ordinary nut - *Corylus avellana*, cornel- *Cornus mas* and etc.

In the upper part of the forest there can be found: beech- *Fagus orientalis*, maple- *Acer laetum*, Norway maple - *Acer platanoides*, Caucasian hornbeam - *Carpinus caucasica* and others [1,2].

* Corresponding author: Tamar Nadiradze

2. Material and methods

The research object was the Saguramo Range. As a result of the monitoring carried out in 2016-2020, young endemics and relics of Georgia and the Caucasus, as well as rare and critically endangered plants were identified here. There floristic lists have been compiled.

The following criteria have been used: a. Species that are intensively collected for various purposes (medicinal, food, aromatic, decorative, etc.); b. According to the status of the species (frequent, rare, endangered, object of the Red Book, included in IUCN and CITES lists).

Priority has been given to the species that need protection, are globally threatened, are endemic, and overexploitation of which can lead to their extinction.

3. Results and discussion

According to the study results, 10 species of endemics of Georgia were recorded in different parts of Saguramo ridge: *Anthemis saguramica* Sosn., *Buxus colchica* Pojark., *Cerastium argenteum* Bieb., *Erysimum caucasicum* Trautv., *Euphorbia boissieriana* (Woronow) Prokh., *Galanthus kemulariae* Kuth., *Onobrichis angustifolia* Chinth., *Psephellus carthalinicus* Sosn., *Primula saguramica* Gavr., *Symphytum grandiflorum* A.DC.

Worth noticing is the fact, that two mentioned species - *Anthemis saguramica* Sosn. and *Primula saguramica* Gavr. had been observed by us in previous years, yet, during the research period, despite the extraordinary search, we could not find any trace of them. We were able to trace a small grove of Colchian boxwood (*Buxus colchica* Pojark.) described by Troitsky at the beginning of the last century.

As a result of monitoring, 37 species of Caucasus endemics have been revealed: *Campanula alliariifolia* Willd., *C. hohenackeri* Fisch., C.A.Mey. et Ave-Lall., *C. oblongifolia* (K.Koch) Charadze, *Cerastium holosteum* Fisch. ex Hornem., *Cephalaria gigantea* (Ledeb.) Bobrov, *Cicerbita deltoidea* (Bieb.) Beauverd, *Chaerophyllum roseum* Bieb., *Corylus iberica* Wittm. ex Kem.-Nath., *Dianthus caucaseus* Smith, *D. subulosus* Freyn et Conrath, *Delphinium ochroleucum* Stev. ex DC., *Isatis iberica* Stev., *Helleborus caucasicus* A. Braun, *Hesperis matronalis* L., *Hyssopus angustifolius* Bieb., *Ficaria ledebourii* Grossh. et Schischk., *Galega orientalis* Lam., *Lotus caucasicus* Kuprian., *Ornithogalum magnum* Krasch. et Schischk., *Pachyphragma macrophyllum* (Hoffm.) N.Busch, *Paeonia caucasica* (Schipcz.) Schipcz., *Pimpinella aromatica* Bieb., *Primula woronowii* Losinsk., *Pyrus georgica* Kuth., *Rubus dolichocarpus* Juz., *Seseli grandivittatum* (Somm. et Levier) Schischk., *Sedum caucasicum* (Grossh.) Boriss., *S. oppositifolium* Sims., *Sempervivum transcaucasicum* Muirhead, *Scutellaria orientalis* L., *Symphytum caucasicum* Bieb., *Taraxacum praticola* Schischk., *Teucrium nuchense* K.Koch, *Thymus tflisiensis* Klokov et Des.-Shost., *Tragopogon tuberosus* K.Koch, *Tulipa eichleri* Regel, *Ziziphora serpyllacea* Bieb. [3, 4]. From 161 species included in "Red Book" Georgia [4], 17 grow in Saguramo Range: *Acer ibericum* Bieb., *Astragalus caucasicus* Pall., *Berberis iberica* Stev. et Fisch., *Buxus colchica* Pojark., *Celtis caucasica* Willd., *Corylus iberica* Wittm. ex Kem.-Nath., *Hedera pastuchovii* Woron., *Hippophae rhamnoides* L., *Juglans regia* L., *Paeonia caucasica* (Schipcz.) Schipcz., *Punica granatum* L., *Staphylea colchica* Stev., *S. Pinnata* L., *Taxus baccata* L., *Tulipa eichleri* Regel, *Ulmus minor* Mill., *Vitis sylvestris* Gmel. [5]. From the "Red List" objects of Georgia, 7 species of plants are represented on Saguramo Range: *Acer ibericum* Bieb., *Buxus colchica* Pojark., *Juglans regia* L., *Staphylea colchica* Stev., *Taxus baccata* L., *Ulmus glabra* Huds., *Ulmus minor* Mill. [6].

From the species included in the red list of endemic plants of the Caucasus, we identified 36 species of medicinal plants in the research area: *Alcea rugosa* Alef., *Astragalus caucasicus* Pall., *Acer ibericum* Bieb., *Berberis iberica* Stev. et Fisch., *Campanula alliariifolia* Willd., *Cyclamen vernalis* Sweet, *Centaurea bella* Tautv., *Cerastium argenteum* Bieb., *Corylus iberica* Wittm. ex Kem.-Nath., *Convallaria transcaucasica* Utkin, *Cytisus caucasicus* Grossh., *Dictamnus caucasicus* (Fisch. et C.A.Mey) Grossg., *Dianthus subulosus* Freyn et Conrath, *Echinops sphaerocephalus* L., *Ficaria ledebourii* Grossh. et Schischk., *Iris caucasica* Stev., *Isatis iberica* Stev., *Hedera helix* L., *Helleborus caucasicus* A.Braun, *Hyssopus angustifolius* Bieb., *Galanthus alpinus* subsp. *caucasicus* Gagnidze, *Galega orientalis* Lam., *Lotus caucasicus* Kuprian., *Ornithogalum magnum* Krasch. et Schischk., *Ophrys caucasica* Woronow ex Grossh., *Pachyphragma macrophyllum* (Hoffm.) N. Busch, *Paeonia caucasica* (Schipcz.) Schipcz., *Polygonatum glaberrimum* K.Koch, *Primula woronowii* Losinsk., *Pyrethrum sericeum* (Adams) Bieb., *Rhamnus pallasii* Fisch. et C.A.Mey., *Sedum caucasicum* (Grossh.) Boriss., *S. oppositifolium* Sims, *Symphytum grandiflorum* A.DC., *Taraxacum praticola* Schischk, *Tulipa*

64 species of relict plants have been recorded in the research area, including 45 species of tree-bushes: *Acer campestre* L., *A. laetum* C.A.Mey., *Atraphaxis caucasica* (Hoffm.) Pavlov, *Buxus colchica* Pojark., *Cotinus coggygria* Scop., *Carpinus*

caucasica Grossh., *C. orientalis* Mill., *Cercis siliquastrum* L., *Celtis caucasica* Willd., *Cornus mas* L., *Cerasus incana* (Pall.) Spach, *Corylus avellana* L., *Cotoneaster integerrimus* Medik., *C. Racemiflorus* (Desf.) Booth ex Bosse, *Crataegus pentagyna* Waldst. et Kit., *C. kyrtostyla* Fingerh., *Clematis vitalba* L., *Cytisus caucasicus* Grossh., *Daphne mezereum* L., *Ephedra procera* Fisch. et C.A.Mey., *Elaeagnus angustifolia* L., *Fagus orientalis* Lipsky, *Ficus carica* L., *Fraxinus excelsior* L., *Hedera colchica* (K.Koch) K.Koch, *H. helix* L., *Hippophae rhamnoides* L., *Ilex colchica* Pojark., *Jasminum fruticans* L., *Juglans regia* L., *Lonicera caprifolium* L., *Mespilus germanica* L., *Morus alba* L., *Paliurus spina-christi* Mill., *Prunus spinosa* L., *Punica granatum* L., *Pyracantha coccinea* M. Roem., *Pyrus communis* L., *Rhamnus cathartica* L., *Rosa canina* L., *Rhus coriaria* L., *Rubus caesius* L., *Ruscus aculeatus* L. subsp. *ponticus* (Wornow) Gagnidze, *Smilax excelsa* L., *Staphylea colchica* Stev., *S. pinnata* L., *Spiraea hypericifolia* L., *Swida australis* (C.A. Mey.) Pojark., *Taxus baccata* L., *Tilia begoniifolia* Stev. (*T. caucasica*), *Quercus iberica* Stev.

19 species of herbaceous medicinal plants are relict: *Atropa caucasica* Kreyer, *Arum albispalum* Stev. ex Ledeb., *Asparagus verticillatus* L., *Convallaria transcaucasica* Utkin, *Dactylis glomerata* L., *Datisca cannabina* L., *Eupatorium cannabinum* L., *Helleborus caucasicus* A. Braun, *Lycopus europaeus* L., *Pachyphragma macrophyllum* (Hoffm.) N.Busch, *Paris incompleta* M.Bieb., *Phyllitis scolopendrium* (L.) Newm., *Polypodium vulgare* L., *Symphytum caucasicum* M. Bieb., *S. grandiflorum* A. DC., *Sambucus ebullus* L., *Sanicula europaea* L., *Tamus communis* L., *Zygophyllum fabago* L. [8, 9].

Saguramo Range is a part of Tbilisi National Park, where protection of biodiversity is appropriately controlled. However, during the purpose-built field trips conducted by us over the years in this territory, significant reduction and in some cases, complete destruction of existing populations of plants distinguished by medicinal and other useful properties (economic, food, decorative, essential oil, coloring, etc.) can be observed.

Based on the quantitative evaluation of the threat level, a list of medicinal plants under anthropogenic stress and exposed to natural threats on Saguramo Ridge was compiled. It includes about 70 species of 34 families, which are rarely found, are represented in fragments, in the form of small populations, single individuals and belong to the objects of the "Red Book" of Georgia. In particular, these species are:

- **Adiantaceae** – *Adiantum capillus-veneris*
- **Amaryllidaceae** – *Galanthus kemulariae*
- **Asparagaceae** – *Asparagus officinalis*, *A. verticillatus*
- **Aspleniaceae** – *Asplenium trichomanes*, *A. septentrionale*, *Ceterach officinarum*
- **Asphodelaceae** – *Asphodeline lutea*
- **Boraginaceae** – *Lithospermum officinale*, *Cynoglossum officinale*
- **Buxaceae** – *Buxus colchica*
- **Caryophyllaceae** – *Dianthus subulosus*, *Saponaria officinalis*
- **Colchicaceae** – *Colchicum umbrosum*
- **Compositae** – *Anthemis saguramica*, *Centaurea bella*, *Petasites georgicus*, *Pyrethrum sericeum*,
- **Convallariaceae** – *Convallaria majalis* subsp. *transcaucasica*,
- **Crassulaceae** – *Sempervivum transcausicum*
- **Cruciferae** – *Hesperis matronalis*
- **Cucurbitaceae** – *Bryonia dioica*
- **Dioscoriaceae** – *Tamus communis*
- **Dipsacaceae** – *Cephalaria gigantea*
- **Hyacinthaceae** – *Bellevalia paradoxa*, *B. speciosa*
- **Iridaceae** – *Crocus adamii*, *C. speciosus*, *Gladiolus italicus*, *Iris caucasica*, *I. pumila*, *I. reticulata*.
- **Labiatae** – *Ajuga chia*, *Hyssopus angustifolius*, *Nepeta cataria*, *Phlomis pungens*, *Ph. tuberosa*, *Salvia sclarea*, *Saturea spicigera*, *Ziziphora serpillaceae*
- **Leguminosae** – *Lotus caucasicus*,
- **Liliaceae** – *Lilium szovitsianum*, *Tulipa eichleri*
- **Melanthiaceae (Trilliaceae)** – *Paris incompleta*
- **Orchidaceae** – *Cephalanthera longifolia*, *C. damasonium*, *Ophris caucasica*, *Orchis purpurea*, *O. simia*, *O. laxiflora*, *O. flavescens*, *Platanthera chlorantha*
- **Paeoniaceae** – *Paeonia caucasica*
- **Polypodiaceae** – *Polypodium vulgare*

- **Primulaceae** - *Primula saguramica*
- **Rutaceae** - *Dictamnus caucasicus*
- **Scrophulariaceae** – *Digitalis lanata*, *D. ferruginea*
- **Solanaceae** – *Atropa caucasica*
- **Staphyleaceae** – *Staphylea colchica*, *S. pinnata*
- **Taxaceae** – *Taxus baccata*
- **Thymelaeaceae** – *Daphne mezereum*, *D. pontica*
- **Umbelliferae** – *Pimpinella aromatica*
- **Vitaceae** – *Vitis sylvestris*

About 30 species of them are critically endangered: *Anthemis saguramica*, *Atropa caucasica*, *Asphodeline lutea*, *Asparagus officinalis*, *Adiantum capillus-veneris*, *Asplenium septentrionale*, *Ceterach officinarum*, *Dianthus subulosus*, *Digitalis lanata*, *D. ferruginea*, *Iris caucasica*, *I. pumilala*, *I. reticulata*, *Hesperis matronalis*, *Hyssopus angustifolius*, *Lotus caucasicus*, *Ophrys caucasica*, *Orchis purpurea*, *O. mascula*, *O. simia*, *Paeonia caucasica*, *Pimpinella aromatica*, *Platanthera chlorantha*, *Primula saguramica*, *Sempervivum transcaucasicum*, *Tulipa eichleri* [10, 11, 12]

4. Conclusion

The study revealed, that the species mentioned above are endangered. The reasons for the reduction of these plants and the main limiting factors are: degradation of locations, construction and expansion of roads, creation of infrastructure for tourists, secretly and illegally cutting trees, anthropogenic stress, poaching, uncontrolled collection of plants - flowers, fruits, stems and bulbs, for various purposes, illegal trade in decorative plants. These factors, in many cases, lead to their destruction.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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