

## **RHODIOLA ROSEA L. 'S PRESERVATION STATUS IN THE CĂLIMANI NATIONAL PARK**

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**Key words:** *Rhodiola rosea* L., Călimani National Park, preservation status

### **INTRODUCTION**

*R. rosea* may be found in the mountain areas of 28 European countries. Some species range in North America, Alaska, Canada, in the Northern mountains from USA, as well (Brown et al., 2002; Rohloff, 2002; Galambosi, 2005; Kylin, 2010). In Norway, *R. rosea* ranges from cost regions (sea level) up to 2280 m in the mountains (Alm, 2004; Galambosi, 2005), whereas in other areas it ranges in the mountains from 1000 to 5000 m in altitude (Rohloff, 2002). According to the Romanian Flora, *R. rosea* may be found in the alpine area of the Călimani, Rodnei, Ceahlău, Rarău, Bucegi, Făgăraș Mountains, in Maramureș etc.

The systematic classification of the *Rhodiola rosea* L. species is (according to:

[www.gwannon.com/species/Rhodiola-rosea](http://www.gwannon.com/species/Rhodiola-rosea)):

**Regnum:** *Plantae*

**Phylum:** *Magnoliophyta*

**Class:** *Magnoliopsida*

**Order:** *Rosales*

**Family:** *Crassulaceae*

**Genus:** *Rhodiola*

**Species:** *Rhodiola rosea*

**Subspecies:** *R. rosea*, ssp. *atropurpurea*

*R. rosea*, ssp. *borealis*

*R. rosea*, ssp. *elongata*

*R. rosea*, ssp. *integrifolia*

*R. rosea*, ssp. *krivochizhini*

*R. rosea*, ssp. *neomexicana*

*R. rosea*, ssp. *polygama*

*R. rosea*, ssp. *roanensis*

*R. rosea*, ssp. *sachalinensis*

*R. rosea*, ssp. *tachiri*

**Varieties:** *R. rosea*, var. *alaskana*

*R. rosea*, var. *alpina*

*R. rosea*, var. *integrifolia*

*R. rosea*, var. *scopolii*

*R. rosea*, var. *subalpina*

**Forms:** *R. rosea*, forma *purpurascens*

*R. rosea* has a circumpolar mountaneous /alpine range, and is a hemycryptophyte with thick rizomes. In 1958 Hultén (cited by Alm, 2004) considered *R. rosea* as: „A collective species comprising many races that differ from each other by

size, shape, crenate leaves and flower colour. There are certain opinions according to which the species *R. rosea* may comprise two subspecies: *R. rosea* ssp. *rosea* (L.) – the common roseroot, and *R. rosea* ssp. *arctica* (Boriss.) A. and D. Löve – the arctic roseroot (Galambosi, 2005). In Norway, for instance, the *R. rosea* plants from the lower regions belong to the *rosea* subspecies, and the ones from the high mountains to the *arctica* subspecies, (Alm, 2004). Despite its succulent, fleshy appearance, the species is in a constant need for water supply.

According to the Romanian Flora, volume IV (1956, pages 49-50) *Rhodiola rosea* L. belongs to the *Crassulaceae* family, its height ranges from 10 to 30 cm, it has a bushy appearance, a thick fleshy cylindrical rhizome with a persistent rose scent, many buds on the rhizome that develop aerial stems. The stems are erect, simple, densely arranged leaves, that sometimes appear slightly coloured in red at the top. The upper stem leaves are densely arranged, alterne, narrow ovate or lanceolate, sessile, base cuneate, pointed, rarely obtuse, up to 3 cm in length, dentate margins, flat, fleshy, hairless. The lower stem leaves are wider, reverse ovate, elongated. The inflorescence is a dense terminal corymbus, flowers unisexual-dioic, 4-merous, rarely 3- or 5-merous. The male flowers bear 4 lanceolate short purple sepals, 4 linear yellowish or reddish petals of 3-4 mm in length, 8 stamens longer than the petals and 2-4 ovaries, usually aborted. The female flowers comprise 4 sepals, 4 petals up to 2 mm in length (frequently absent), 4 ovaries, each bearing a nectariferous flake at the base, ovate-elongated, bilobate to the tip. The fruits are erect follicles of 6 to 12 mm in length, sharp pointed. Brown seeds, up to 1.5 mm in length. *Rhodiola rosea* is a perennial hemicyptophyte saxicole mesohygrophyte, chinophile, (Sârbu et al., 2013).”

*Rhodiola* species are well-known and used by the traditional Tibetan medicine for over 1000 years (KYLIN, 2010). LINNÉ stated (in his works from 1748 and 1749) that *R. rosea* is used as an astringent and also to cure hernia, leucorrhoea, hysteria and head aches. According to the data provided by Ramazanov and Abidoff, 2000; Brown et al., 2002; Alm, 2004; Galambosi, 2005; Kylin, 2010; Panossian et al., 2010, the plant is known and used in the various

regions of its spreading area, to improve physical endurance, work productivity, longevity, resistance improve physical endurance, work productivity, longevity, resistance to altitude sickness, to remove fatigue, treat depression, anemia, impotence, infections, gastro-intestinal and nervous system disorders etc. There is a kind of legend in Siberia that says: "the people that drink *Rhodiola* tea will live more than 100 years", (Ramazanov și Abidoff, 2000).

It is considered a symbol of fertility in some mountain villages from Siberia. Even nowadays a cluster of *R. rosea* roots is offered to the couples that get married, to improve fertility and giving birth to healthy children (SARATIKOV, 1987, cited by BROWN et al., 2002). The benefits of this plant in the treatment of pain (including head aches), scurvy, hemorrhoids, as a stimulant and anti-inflammatory were described in Germany. In Middle Asia, the tea of *R. rosea* is the most efficient remedy to fight cold and influenza during very harsh winters characteristic to this region. In Mongolia it is recommended in the fight against cancer and tuberculosis (KHAIDAIEV and MENSHIKOVA, 1978, cited by BROWN et al., 2002).

Both the rhizomes and the herba are edible, therefore it was introduced into people's nutrition, as it is the case of the Inuit in Groenland, the eskimo people in North America and the natives of Alaska. It appears that *R. rosea* is one of the 20 most frequently used plants in Alaska and Siberia. Alm (2004), quoting from Pontoppidan (1752) and Gunnerus (1766), related that the roots were a remedy against scurvy in Norway. The same author reported that, along the Western Coast of Norway, the *R. rosea* decoction was used to wash the human hair in a certain period of time (in the folk tradition, it stops hair fall), to stimulate hair growth, or in the treatment of various hair problems (such as dandruff). The same decoction was given to horned animals to treat some specific diseases and also intestinal parasites. In a certain age, in Norway, *R. rosea* was cultivated on roofs in order to protect the house from fire, a system rarely used nowadays, and the cultivated plant is the turf.

The species habitat: The species was identified on isle regions within some isle regions belonging to the 8220 habitat – Peaks with chasmophytical vegetation on silicious rocks.

## MATERIAL AND METHODS

- Global Positioning System (GPS)
- Photo camera
- Field determinator and work sheets
- Maps containing the park's boundaries

In view of identifying our species of interest, *Rhodiola rosea* L., several tracks were searched, within the characteristic habitats for this species, along which visual observations were made. By

means of the GPS, the appropriate populations, regions and habitats were localized.

## RESULTS AND DISCUSSIONS

This species' distribution within the Calimani National Park:

*R. rosea* was identified in two areas: below the Călimani Izvor Peak (47° 7'30.06"N; 25°17'30.50"E) and within the Pietrosul mountain peak (47° 7'31.56"N; 25°11'09.28"E). The plants from these two areas were field determined during two consecutive years (July - August 2011-2012).

The preservation status of *Rhodiola rosea* is a stable and favourable one. The observed plants (see photos 1-6) displayed vigorous stems with a length ranging between 25 and 30 cm. The upper leaves were 2.5 to 3 cm long, dentate margins, flat, fleshy, hairless, and the basal leaves were wider. The corymbic inflorescences had dioic, very rarely hermaphrodite flowers. The seeds were up to 1.5 mm in length and brown colour.

The original photos (Photos 1-6) represent several aspects with the *Rhodiola rosea* plants in their native habitats from the Călimani National Park.

Regarding this species' threats and menaces, they are rather few. This fact is due the inaccessible habitat for many tourists. If harvested for its many medicinal purposes, the impact is a major one, leading to the extinction of *Rhodiola rosea* in those regions. This is due to the fact the plants grow as bushes and are easily collected with the underground part. Another menace is represented by the sheep pasturage on the Călimani Izvor peak. The plants may be trodded or eaten by the sheep that arrive in that area. The impact is not significant as the sheep only consume the aerial parts of the plant, but the rhizome grow new offsprings and perpetuate the species from one year to another.

Considering the recommendations on the regulations to reduce the impact, they are as following: The plants' harvesting together with the underground parts leads to the extinction in that specific place. These actions should be restricted, and fines established in case of non-compliance. The plants' prelevation with the underground parts should have the curator's permission, and applied only to those plants within stable populations and a favourable preservation status. This latter data should be vulgarized by means of info boards, flyers, brochures, info campaigns, volunteers.

Locating the areas in which the proposed regulations will be enforced: info boards flyers, brochures, maps with touristic routes, info campaigns, volunteers:

- At the park's access areas
- Along the touristic routes
- In the specially arranged resting areas
- Within the info places, chalets or boarding houses.



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

## CONCLUSIONS

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## ABSTRACT

*Rhodiola rosea* L. is a a major phytopharmaceutically important species that grows spontaneously in our country. This paper aims to analyze the *Rhodiola rosea*'s preservation status within the Călimani National Park, the types of habitats in which this species was found, the relationship with the natural environment, the threats and the management proposals for a sustainable development.

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