

## SUMMER SNOWFLAKE (*LEUCOJUM AESTIVUM* L.) – A RARE ADDITION TO THE FLORA OF “PRUTUL DE JOS” SCIENTIFIC RESERVE, REPUBLIC OF MOLDOVA

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### Abstract

Currently, the summer snowflake is suffering distributional and populational declines across its range, and due to this local scarcity, it is protected by law in several countries within its distribution range. The distribution of this species in the Republic of Moldova is very little studied, and currently this species is classified as critically endangered in the 3rd edition of the national Red Data Book, with only seven known locations. This short communication aims to reveal a new location of the summer snowflake – „Prutul de Jos” Scientific Reserve, increasing the conservation importance of the reserve even more.

**Keywords:** Beleu lake, national distribution, new record, Red Data Book, threatened species.

### Introduction

The summer snowflake (*Leucojum aestivum* L.) is a native Western Palearctic species belonging to the *Amaryllidaceae* family, consisting of two valid subspecies - *L. aestivum* L. subsp. *aestivum* and *L. aestivum* L. subsp. *pulchellum* (Salisb.) Briq. currently considered threatened in many parts of its range. Although not globally threatened, it is included in many national red lists and currently benefits from legal protection status, due to its local scarcity [Parolo et al. 2011]. This wetland species has recently experienced declines both in distribution and population size due to the intensive destruction of wetlands and overharvesting for alkaloid production [Parolo et al. 2011]. Since the 19th century, 80% of the natural wetlands from the Danube river basin have been drained to make space for farmland [Diester, 1999]. Since most of the native range of the summer snowflake is situated within the borders of the Danube river basin [Parolo et al. 2011], it is expected that these populations have greatly suffered. The summer snowflake is mostly a lowland species, inhabiting floodplain forests close to waterbodies such as lakes, rivers or occasionally on the banks of canals [Parolo et al. 2011; Cassir and Ghendov, 2022]. It can also inhabit areas far from waterbodies, as long as sufficient soil moisture is available during the growing season, particularly in microdepressions where excess water tends to accumulate [Parolo et al. 2011]. It is generally considered very tolerant of high moisture in the environment and soil tolerant [Pavlova et al. 2015], however it was shown to prefer nitrogen rich and sedimentary types of soil, such as clay or loam [Parolo et al. 2011].

Currently included in the third edition of the Red Book from the Republic of Moldova (2015), the summer snowflake is classified at the national level as Critically Endangered (CR) according to IUCN standards. Until now, only seven locations from the Republic of Moldova are known to host this rare species [Pînzaru, 2018; Cassir and Ghendov, 2022; Ghereg et al.

2023; Lazarchevici, 2023]. Multiple factors have contributed for the scarcity of this species in the Republic of Moldova, the most relevant being the following: the presence at the northern limit of its range around the Black Sea [Parolo et al. 2011; Cassir and Ghendov, 2022], the decline in availability of unfragmented and pristine floodplain forests, and the lack of dedicated field effort in appropriate and inaccessible wetlands during the flowering season. According to Ghereg et al. (2023) the summer snowflake is in bloom during April-May, detectability drastically reducing outside this time period. Nowadays, wetlands cover only 2.9% (96.900 ha) of the total area of the country, of which only 8924 ha are constituted by marshland (HG357/2020). Floodplain forests are also very scarce and mainly along the bigger rivers such as Prut and Dniester. Woodland as a whole makes up about 13.6% of the country's land cover (National Bureau of Statistics from Moldova, 2023), of which poplar (*Populus* sp. L.) and willow (*Salix* sp. L.) represent no more than 1.3% and 1.2% respectively [Talmaci et al. 2018]. This being said, the combination of little field effort in the few potential and inaccessible sites from southern Moldova where the last floodplain forests remain, makes the local scientific knowledge about the species very scarce. Until 2022, the only known population in the country was in the central west Republic of Moldova and it was comprised of only six locations from the vicinity of Prut river floodplains, close to the following localities: Călmăuți, Cioara, Cotul Morii, Leușeni, Nemțeni villages, from Hîncești district, and Sărata-Răzeși from Leova district [Pînzaru, 2018; Ghereg et al. 2023; Lazarchevici, 2023]. The habitat in which the summer snowflake was found in these locations consists mainly of white willow (*Salix alba* L.) and white poplar (*Populus alba* L.) floodplain forest. In 2022 a seventh location was found near Crihana Veche village, Cahul district. This particular location is easily accessible, and it sits inside of Lower Prut Lakes Ramsar site, but outside of Lower Prut Scientific Reserve, this way being more prone to local extinction due to human interventions. The former mentioned protected area hosts no less than 310 plant species [Postolache et al. 2017, in Cassir, 2022], and in this study a new and rare floristic addition has been identified.

### Material and methods

The observation was made during a field trip in the forest compartment 5 of "Prutul de Jos" Scientific Reserve. The protected area was established in 1991, comprising a total of 1775 ha, of which 168,3 are strictly protected (Postolache, 2021). At least 310 rare species of vascular plants, with 15 of them included in the 3<sup>rd</sup> edition of the Red Data Book of the Republic of Moldova are found in this wetland (Postolache, 2021).

### Results and discussion

On 23/04/2025 a patch of flowering summer snowflakes was discovered in one of the most isolated and inaccessible forests from the vicinity of Beleu Lake (Figure 1, 2B). The species was found in a primary white willow forest, exhibiting minimal anthropogenic disturbance, with overgrown dewberry (*Rubus caesius* L.) in the shrub layer (Figure 2A), very similar to the described habitat in which the summer snowflake was found by Pînzaru (2018) and Cassir and Ghendov (2022). Pînzaru (2018) even described and proposed a new subassociation, including the summer snowflake as a characteristic species – *Salicetum albae leucojetosum aestivali*. Just a single patch numbering a few individuals was found in the floodplain forests of Beleu Lake. A total of 8 locations are now known to host the summer snowflake spanning from its most northern location, Nemțeni Natural Reserve (Hîncești district), to its most southern location, Prutul de Jos Scientific Reserve (Figures 1, 3). Even though the latter mentioned location is strictly protected, it is also heavily subject to poaching (authors' observation), making it possible to threaten species of fauna and flora. It is probable that the summer snowflake occurs in more locations along Prut river, resulting in a more

connected distribution range. Since work for the much awaited fourth edition of the Red Book of the Republic of Moldova has started, it is important that all the mentioned locations are to be included. It is also recommended that more field work should be done, to properly assess the actual distribution and conservation status of the species in the Republic of Moldova. This is particularly important given that the summer snowflake is a perennial plant, flowering in the same location each spring [Parolo et al. 2011]. This site fidelity increases its vulnerability to habitat disturbance, making targeted protective measures crucial for ensuring its long-term conservation. Knowledge gaps could be filled if more field effort would be conducted during April-May, downstream of Nemțeni floodplain forests. Another relevant task would be to search upstream of Nemțeni, in order to find the absolute limit of the distribution range.

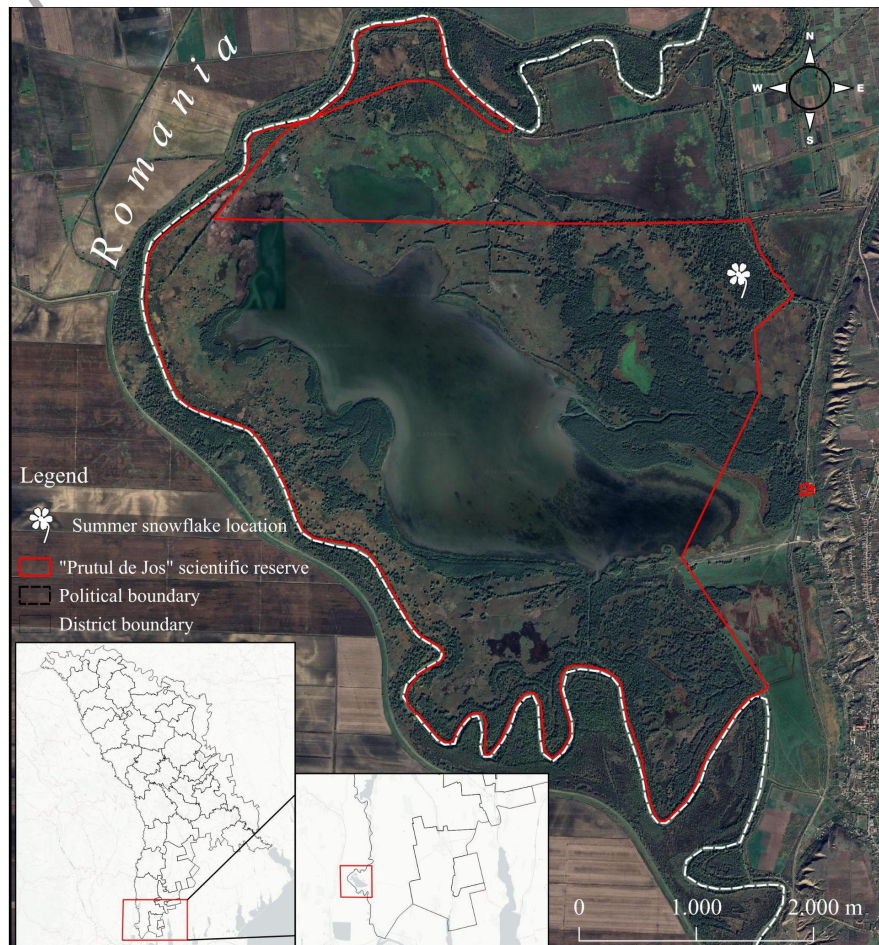


Figure 1. *Leucojum aestivum* found in the floodplain forests of "Prutul de Jos" Scientific Reserve (23 April, 2025).



Figure 2. A – Floodplain forest with white willow and dewberry where *Leucojum aestivum* was found (23 April, 2024); B – *Leucojum aestivum* found in the floodplain forests of ‘Prutul de Jos’ Scientific Reserve (23 April, 2025).

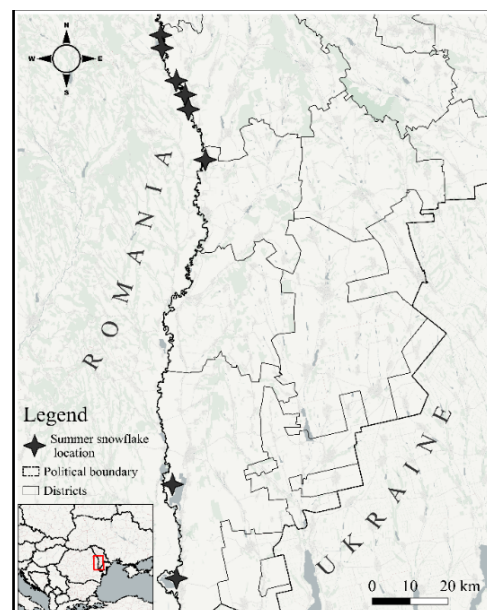


Figure 3. National distribution of *Leucojum aestivum*. Map drawn using QGIS v.3.28. (<http://qgis.osgeo.org>).

### Conclusions

The floristic list of ‘Prutul de Jos’ Scientific Reserve has increased by a rare addition, namely the threatened and protected summer snowflake, highlighting the importance of this protected area for biodiversity conservation. Currently a total of 8 locations is known to host the summer snowflake in the Republic of Moldova, however more field work is required to establish the whole distribution range.

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