Acta Bot. Croat. 85 (1), 83–86, 2026
DOI: 10.37427/botcro-2025-019

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Short Communication

First record of *Spiraea hypericifolia* subsp. *hypericifolia* (Rosaceae) in Kosovo

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Abstract – This study reports the first record of *Spiraea hypericifolia* subsp. *hypericifolia* in Kosovo, found on Mt Golesh at 740 m a.s.l. The taxon forms a dense population on serpentine substrates, occupying a specific ecological niche. Due to its limited distribution and specific habitat requirements, it faces a high risk of extinction. A preliminary conservation status assessment suggests it is Vulnerable (VU) D2 according to IUCN criteria. Additional field surveys and habitat monitoring are needed to protect this population against environmental and anthropogenic pressures.

Keywords: central Kosovo, IUCN, plant ecology, plant taxonomy, serpentine

Introduction

The genus *Spiraea* L. (Rosaceae) is well-known for its ornamental values and ecological importance. Different species have demonstrated notable biological activities, including anti-inflammatory, antioxidant, antiviral, antibacterial, antifungal and anticancer effects, through the study of their extracts and individual compounds (Kostikova and Petrova 2021, Kostikova et al. 2022). Comprising approximately 80 to 100 species, it is widely distributed across the temperate regions of the Northern Hemisphere, from North America to East Asia and extending into Europe (Potter et al. 2007, Roloff and Bärtels 2008). Taxa within this genus are characterized by their diverse morphological traits and adaptability to various environmental conditions, which have allowed them to occupy a range of habitats from forests to open grasslands (Kubitzki 2004).

In Europe, *Spiraea* is known to have seven native species with eight subspecies: *S. cana* Waldst. & Kit., *S. chamaedryfolia* L., *S. crenata* L. [*S. crenata* subsp. *crenata*, *S. crenata* subsp. *parvifolia* (Pau) Romo], *S. decumbens* W.D.J.Koch, [*S. decumbens* subsp. *decumbens*, *S. decumbens* subsp. *tomentosa* (Poech) Dostál], *S. hypericifolia* L. [*S. hypericifolia* subsp. *hypericifolia*, *S. hypericifolia* subsp. *obovata* (Willd.) H. Huber], *S. media* Schmidt [*S. media* Schmidt subsp. *media*, S. *media* subsp. *polonica* (Błocki) Dostál] and *S. salicifolia* L. (Kurtto 2009). The only species of the genus mentioned for Kosovo thus far is *S. crenata*, reported from the Gorge of Prizren (Jovanović 1972). Here we report for the first time *Spiraea hypericifolia* subsp. *hypericifolia* in Kosovo, found during fieldwork on Mt Golesh (central Kosovo).

The major part of *Spiraea hypericifolia*'s geographical range lies in Eurasia, with a native range extending from southwestern Europe to central and southwestern Asia (Conti and Bartolucci 2023). It is regarded as one of the most evolutionarily developed species within its genus (Yu et al. 2018). The native range of *S. hypericifolia* subsp. *hypericifolia* in Europe includes central Italy and Bulgaria, while its distribution extends eastward to Siberia and the western and central Himalayas (POWO 2024). The discovery of *S. hypericifolia* subsp. *hypericifolia* in Kosovo marks a significant contribution to the botanical knowledge of the region, as it extends the known distribution range of this taxon further west within the Balkans. This record not only highlights the ecological significance of Kosovo as a refuge for species with broad Eurasian distributions but also provides important insights into the biogeographical patterns and evolutionary history of the species in question in the context of the Balkan Peninsula.

Material and methods

The current study is based on field observations on Mt Golesh during 2024. Mt Golesh (22.2 km^2) lies in the central part of Kosovo and belongs to the central mountain chain of the Carraleva Mountains (Marković 1990). It separates the region of Drenica from the Kosovo plain (Pllana 2015), and its highest peak is 1019 m above sea level (a.s.l), making it the highest mountain system in the central part of Kosovo (Çavolli 1997). Approximately 70% of this mountainous area is situated at altitudes ranging from 600 to 980 meters above sea level, while the upper regions exceed 980 m a.s.l. Golesh is recognized as a massif primarily composed of

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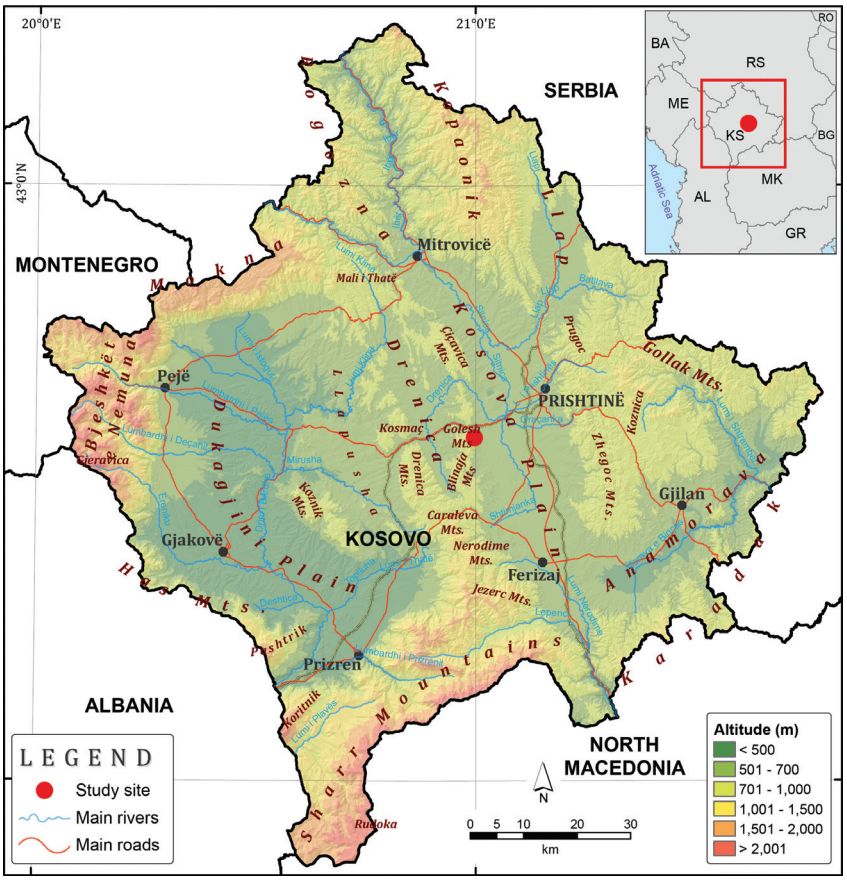

Fig. 1. Map of the study area on Mt Golesh, central Kosovo (circled in red).

harzburgite rock, which consists mainly of two minerals: olivine and low-calcium pyroxene, and features a high percentage of ultramafic (serpentinite) bedrock (Labus 1973). This composition creates a challenging environment for plant growth and development due to chemical, physical, and biotic factors, including drought, the presence of heavy metals, and limited sources of essential nutrients (Herath et al. 2014). From a pedological perspective, the surveyed area consists of loamy deluvium, brownized red soil on compact limestone, reddish-brown loamy soil on red sediments, and moderately deep brown soil on metamorphic rocks (Pavićević et al. 1974). Climatically, the studied site is characterized by harsh, cold winters and hot, dry summers, with an average annual temperature of 9.9 °C, typical of a continental climate (Pllana, 2015). Significant parts of Mt Golesh are legally protected in Kosovo (Nature Monument – IUCN Category III) due to the presence of natural habitats of the Balkan endemic plant species *Forsythia europaea* Degen & Bald (AMMK 2019). The habitat in which *Spiraea hypericifolia* subsp. *hypericifolia* has been recorded lies within this protected area. However, it is situated at the edge of Harilaq Castle, a popular destination for visitors, and thus may be subject to potential negative impacts from tourism.

In addition to the plant taxa of interest, accompanying plant species were also recorded. The nomenclature of the taxa follows the Euro+Med Plantbase Checklist (Kurtto 2009). The collected plant specimens were deposited in the herbarium of the Faculty of Mathematics and Natural Sciences at the University of Prishtina.

Results and discussion

On May 12, 2024, *Spiraea hypericifolia* subsp. *hypericifolia* was found for the first time in Kosovo. The species was growing on the southern slopes of Mt Golesh, at an altitude of 740 meters a.s.l. (Fig. 1). Geographical coordinates: 42.577758 N, 20.996615 E. Coll./Det. Naim Berisha, herbarium code: 00002010.

It was found on the dry, sun-exposed southern slopes of the mountain, over serpentine substrates (Fig. 2). It formed a small population occupying an area of 430 m^2. It was recorded growing in the vicinity of an old oak (*Quercus pubescens* Willd.) forest, on dry grassland with a cover of 90%, along with the following accompanying species: *Alyssum montanum* group, *Chrysopogon gryllus* (L.) Trin., *Trigonella esculenta* Willd., *Goniolimon tataricum* (L.) Boiss. subsp. *tataricum*, *Orlaya grandiflora* (L.) Hoffm., *Xeranthemum annuum* L., *Bupleurum flavicans* Boiss. et Heldr., *Astragalus onobrychis* L., *Teucrium chamaedrys* L., etc.

During the visit to the mountain, only this single, rather dense population was recorded. The subspecies was not found in other parts of the mountain with a similar ecology, nor has it previously been reported in Kosovo. It was also not mentioned in a publication on the flora of Mt Golesh itself (Krasniqi et al. 2019). This may be because the population of this shrub closely resembles blackthorn (*Prunus spinosa* L.) from a distance and has thus been overlooked. It is difficult to determine whether this subspecies population is introduced or native. However, local people reported

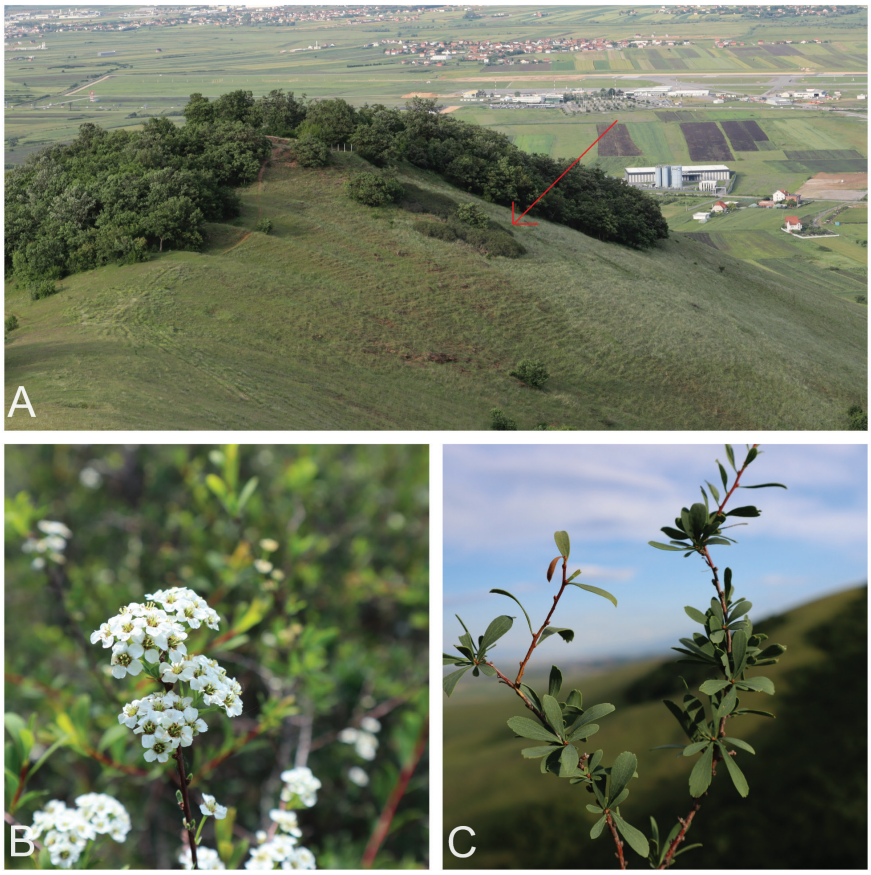

Fig. 2. *Spiraea hypericifolia* L. subsp. *hypericifolia* in Kosovo, Mt Golesh, central Kosovo. A – habitat and location on the mountain (indicated with red arrow), B – flowers, C – stem with leaves (photo: N. Berisha).

that the plant has always been present there, in the same area, extending to those same boundaries, and is particularly known for providing shelter to rabbits.

In a broader European context, this population of *Spiraea hypericifolia* subsp. *hypericifolia* recorded in central Kosovo is located between the reported populations in southern Bulgaria (Jordanov, 1973) and those of central Italy (Conti and Bartolucci 2023). However, the database for reporting the distribution of plant taxa in Europe (Kurtto 2009) appears to be outdated, as it includes only Bulgaria and other Eastern European countries and regions, Moldova, Ukraine, Belarus and European Russia.

In Europe, taxa of the genus *Spiraea* are commonly found in a variety of habitats including mountainous regions, riverbanks, and meadows. These species contribute significantly to local biodiversity and provide important ecological functions such as habitat for pollinators and erosion control. *S. hypericifolia* subsp. *hypericifolia* is known to thrive in arid hemicryptophytic grasslands and shrublands, where it usually forms monophytic shrubs at elevations typically ranging from 670 to 900 m a.s.l. (Dostàl 2010, Conti and Bartolucci 2023). In the Caucasus region, this subspecies is documented in volcanic rocky habitats and at higher altitudes (1290 m a.s.l.) compared to its occurrences in Europe. For example, in Georgia, *S. hypericifolia* subsp. *hypericifolia* was recorded by K. Reiner (Herbarium GJO – Ref.: 28.201), in bushy and volcanic rocky environments.

Spiraea hypericifolia subsp. *hypericifolia* is a shrub taxon that exhibits a highly restricted distribution within Kosovo, being known from only a single locality with an occupied area of merely 430 m^2. Additionally, its presence in the wider region is limited, with isolated populations in central Italy and Bulgaria.

According to the IUCN Red List criteria (IUCN 2024), several criteria are considered in determining the threat level to a plant taxon. Those include: Extent of occurrence (EOO), Area of occupancy (AOO) as well as Population size and trends. Since this is the first report of the occurrence of *S. hypericifolia* subsp. *hypericifolia* in Kosovo, the following data on the site and surrounding area have been taken into consideration. The taxon covers an area of 430 m^2, which means its AOO and EOO are both 4 km^2. During monitoring at its location, the population was estimated at fewer than 250 mature individuals. Combined with the fact that it is known to occur in only one locality within Kosovo, *S. hypericifolia* subsp. *hypericifolia* faces a high risk of extinction in the wild.

Based on IUCN criteria and the current situation of *S. hypericifolia* subsp. *hypericifolia* in Kosovo, a preliminary conservation assessment suggests that the taxon should be classified as Vulnerable (VU) D2. The taxon's EOO is less than 5000 km^2 due to its very restricted range, and its AOO is only 430 m^2, well below the threshold of 500 km^2. With an estimated population size of fewer than 250 mature individuals, the species is found in fewer than five locations,

making it susceptible to stochastic events, environmental changes, and anthropogenic pressures. However, as there is insufficient evidence of population decline, trends, or extreme fluctuations to meet the full criteria for a higher threat category (CR or EN) under Criterion B, the most appropriate classification based on the available data is Vulnerable (VU) D2.

These factors underscore the urgent need for conservation measures to protect the remaining habitat and ensure the survival of *S. hypericifolia* subsp. *hypericifolia* in Kosovo and the broader region. We currently lack data on the habitat situation of *S. hypericifolia* subsp. *hypericifolia*, specifically whether its habitat is stable, declining, or expanding. Local people have noted that, to their knowledge, the shrub has always been present to the same extent. However, it is essential to monitor its habitat in the coming years to determine whether its extent and quality are stable or declining.

In my opinion, conducting additional field surveys is essential to accurately determine the distribution and ecology of the genus *Spiraea* in general, and specifically, the reported taxon *Spiraea hypericifolia* subsp. *hypericifolia* in Kosovo. Furthermore, it is crucial to monitor this taxon and officially assign a national conservation status to the population described here.

Acknowledgements

This research was conducted as part of a project supported by the Ministry of Education of the Republic of Kosovo (Project No. 2-1876-15: The study of diversity, composition, and taxonomy of the genus *Carex* in the Republic of Kosovo). I am grateful to the three reviewers for their insightful comments and suggestions, which have greatly contributed to improving the paper. I also extend my sincere thanks to Prof. Valbon Bytyqi (Department of Geography, UP) for his valuable assistance in preparing the map.

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