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## MEDICINAL PLANTS FROM BJELASICA MOUNTAIN, USED IN TRADITIONAL MEDICINE

### SUMMARY

Bjelasica Mountain in Montenegro is characterized by remarkable biological diversity. A variety of climates, silicate and limestone soil substrates, relief, aquatic resources and preserved nature have conditioned an abundance of different floral elements, including numerous medicinal and endemic plant species. Additionally, medicinal plants have socio-economic significance for the local population. Plants collected from the uncontaminated terrains are used to effectively prevent or treat various diseases. In the area of Bjelasica Mountain, 102 species within 44 families have been recorded for the use in traditional medicine. The most frequent are the representatives of the family *Lamiaceae* (13) and then *Asteraceae* (12). On the basis of results obtained by this study, the largest number of informants (79.01%) collects the two following species: *Ononis spinosa* L. and *Taraxacum officinalis* Weber. The active ingredients, to which the healing effects are attributed, can be found in various plant species and their organs. The highest content of active substances is determined at the beginning of flowering stage. The most exploited part was herb as it is used from 32 plant species, while the least exploited are the spores of *Lycopodium clavatum* L. From 102 plant species recorded for the use in traditional medicine, 40 are also used in conventional medicine and pharmacy. Some plants used in traditional medicine, contain poisonous substances, so the special attention should be paid to possible consequences due to unprofessional processing and use.

**Keywords:** Bjelasica, medicinal plants, traditional medicine, biodiversity, Montenegro

### INTRODUCTION

Mountain regions are among the most important centres of biological diversity in Europe, owing to their pronounced environmental heterogeneity, complex relief, diverse geological substrates, and wide range of climatic conditions. These factors create favourable conditions for the development of rich

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and highly differentiated floras, including numerous medicinal and endemic plant species. In addition to their biological value, mountain ecosystems represent important repositories of traditional ecological knowledge, where long-term interaction between local communities and natural resources has shaped detailed practices of plant use, harvesting, and preparation.

Within the Balkan Peninsula, Montenegro occupies a distinctive position due to its exceptional geomorphological diversity and relatively well-preserved natural landscapes. One of the most floristically complex mountain massifs in northern Montenegro is Bjelasica Mountain, whose biodiversity is conditioned by a combination of silicate and limestone substrates, abundant water resources, and pronounced altitudinal gradients. The relief and climatic diversity of Bjelasica have resulted in the formation of multiple vegetation belts, including an exceptionally complex upper forest limit composed of several ecosystem types, a feature rarely observed elsewhere in the Balkans or Europe (Lakušić, D. *et al.*, 1991; Lakušić, R. *et al.*, 1991).

The central part of the Bjelasica massif includes Biogradska Gora National Park, one of the last remaining primeval forests in Europe and a recognized hotspot of European biodiversity (Blečić and Lakušić, 1970; Čurović *et al.*, 2011; Milošević *et al.*, 2019; Motta *et al.*, 2024). Floristic research in this region has a long tradition, beginning in the late nineteenth century with the work of Baldacci (1892) and continuing throughout the twentieth century with contributions by Novak (1932), Muravjov (1940), Rohlena (1942), Šilić (1983, 1984), Lakušić (1990), Stešević and Petrović (2003). These studies have provided a solid foundation for understanding the taxonomic and ecological complexity of the flora of Bjelasica and surrounding mountain systems.

The first written records of medicinal plant use in Montenegro date back to the early nineteenth century, when numerous species were documented as being collected and traded by local populations (Bojović and Dostjan, 1992). More systematic research on medicinal plants intensified during the second half of the twentieth century (Pulević, 1965; Lakušić and Milojević, 1972; Pulević, 1980; Sarić, 1989), and was later complemented by pharmacognostic and phytochemical studies (Menković, 1997; Jovančević *et al.*, 2011). Ethnobotanical investigations conducted in various mountainous regions of Montenegro and the wider Balkans have confirmed the importance of medicinal plants for both traditional healthcare and rural livelihoods (Pieroni, 2008; Menković *et al.*, 2011; Balijagić *et al.*, 2012; Šavikin *et al.*, 2013; Mullalija *et al.*, 2021).

Despite this long research tradition, comprehensive ethnobotanical studies focused specifically on the Bjelasica Mountain remain limited. At the same time, traditional medicinal knowledge in the region is increasingly threatened by socio-economic changes, rural depopulation, and market-driven overexploitation of certain plant species. Unsustainable harvesting practices, particularly of root- and bark-harvested taxa, pose a growing risk to local plant populations, while unprofessional use of toxic species may have adverse health consequences.

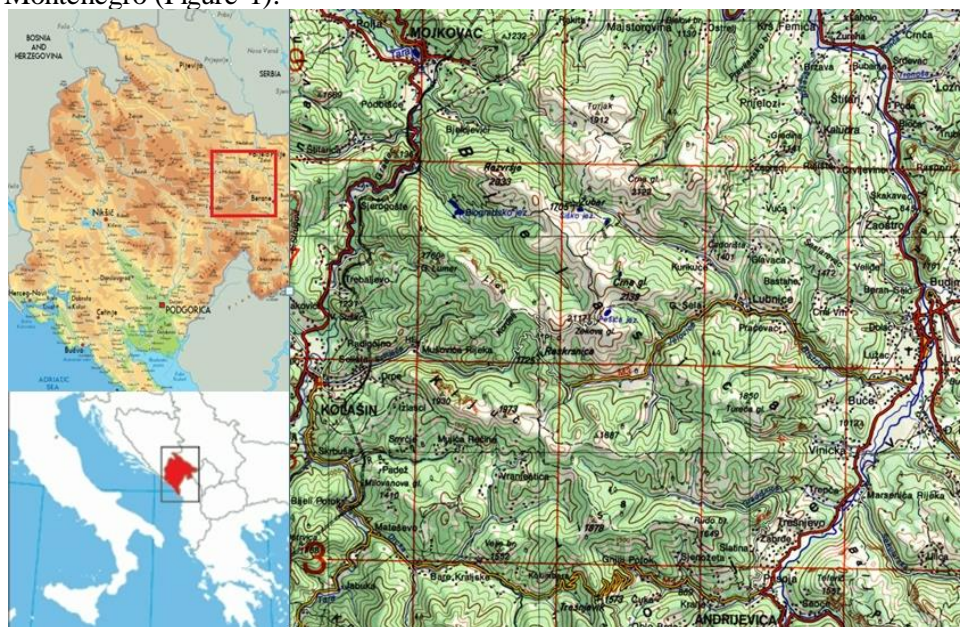
Ethnobotanical research in such contexts is therefore of particular importance, as it enables the documentation and preservation of traditional knowledge, contributes to biodiversity conservation, and provides a scientific basis for the sustainable management of medicinal plant resources. Furthermore, understanding the timing of collection activities in relation to plant phenology offers valuable insight into traditional ecological knowledge and rational harvesting strategies that are often closely aligned with periods of maximum bioactive compound accumulation.

The aim of this study was to document medicinal plant species used in traditional medicine on Bjelasica Mountain and to synthesize data on their taxonomic diversity, patterns of use, and harvesting practices. Specifically, the objectives were to: (i) Record medicinal plant species and their traditional applications; (ii) Analyze the overlap between traditional use and modern medicine and pharmacy; (iii) Examine the timing of collection activities in relation to phenological stages; and (iv) Assess the socio-economic and conservation implications of medicinal plant harvesting in the study area.

## MATERIAL AND METHODS

### *Research area*

The study was conducted on Bjelasica Mountain, located in northern Montenegro (Figure 1).



**Figure 1.** Location of the studied area of Bjelasica Mt. and Montenegro

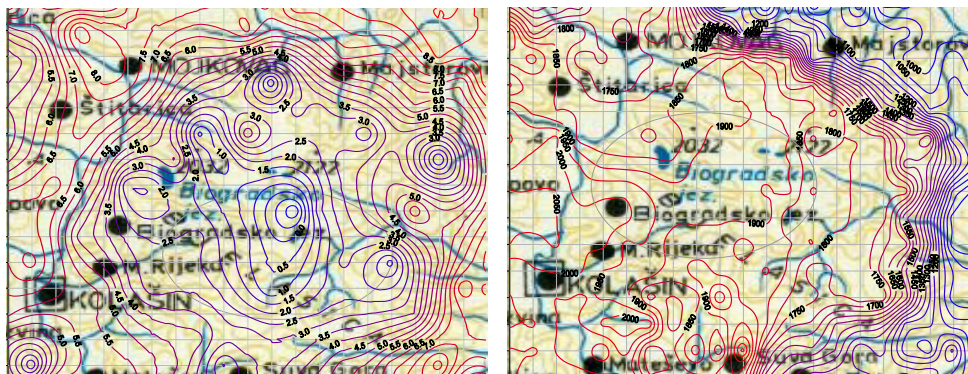
The mountain massif extends between 42°40' - 42°55' N latitude and 19°30' - 19°50' E longitude and is characterized by pronounced altitudinal variation, ranging from approximately 600 to over 2,100 m a.s.l. Bjelasica is

distinguished by a complex geological structure dominated by silicate substrates, locally interspersed with limestone formations, as well as by abundant surface and groundwater resources (Fušić, 1991).

The area of hills and slopes above river valleys and basins, and even plateaus up to about 1300 m above sea level, is depicted by a transitional variant of the continental climate, which is modified by the influence of the alpine climate. At elevations above 1300 m, there is alpine and subalpine climate with long, severe and snowy winters, and very short and cool summers. The municipalities of Berane and Bijelo Polje, located in the valley of the river Lim, have a continental climate, while the municipality of Kolašin in the valley of the river Tara is a representative of the transitional climate type - from the continental to the alpine climate.

The average annual rainfall of the studied area ranges from about 1750 mm (lowland) to about 2000 mm (high-altitude and eastern regions). During the vegetation season, the amount of precipitation is about 500 mm to about 700 mm.

The largest gradients - the concentration of isotherms (Figure 2) are present in the zones with sudden changes in altitude. In the area of Bjelasica Mountain, there are two centres with temperatures below 2° C, of which one covers a much larger area. Moving to the west or to the east, the concentration increases. The south-north direction of isotherms indicates the fact that the temperature changes very quickly in the west-east direction, and very slowly in the south-north direction.



**Figure 2.** Maps of the study region with isotherms (a) and isohyets (b) (Source: Čurović M, 2011)

The isohyets (b) do not change significantly in the whole area of Bjelasica Mountain. Although it is a high mountain zone, there is much less rainfall than in the southern lowlands due to the generation of precipitation in the mountain zones that precede Bjelasica. Since the eastern side of Bjelasica Mt. has significantly less precipitation, there is an intensive concentration of isohyets with extreme gradients. This zone covers the entire eastern side with a longitudinal arc of 180 degrees around Bjelasica itself, where precipitation is less by as much as 1000 mm per year and amounts to about 1850 mm per year.

### *Fieldwork and material processing*

Ethnobotanical fieldwork was carried out during the vegetation seasons from 2017 to 2020. Data were collected through direct interviews with 90 informants residing in villages and rural settlements located on and around Bjelasica Mountain. Informants included local inhabitants, traditional healers, and experienced collectors of medicinal plants. Participation was voluntary, and information was obtained through oral communication.

Semi-structured interviews were conducted using open-ended questions focusing on local plant names, parts used, medicinal applications, preparation methods, and timing of collection. Additional information regarding the mode of administration and perceived effectiveness of remedies was recorded when provided by informants. Particular attention was paid to the seasonal timing of harvesting activities in relation to plant phenological stages. Thus, we recorded a number of plant families and number of species within each family, their use in traditional medicine (T), in modern medicine and pharmaceutical industry (MPh), but we also recorded poisonous plants that can be harmful to humans due to unprofessional use (P).

Plant species were identified using standard floristic literature. The following literature was consulted for different floristic categories: Mountain Plants (Lakušić, 1990); Endemic Plants (Šilić, 1983); Forest Herbaceous Plants (Šilić, 1983), Medicinal Herbs of the Bijelo Polje Region (Baljagić *et al.*, 2010), Medicinal Herbs of Serbia (Sarić M., 1989), as well as key for identification (Josifović *et al.*, 1970-1977; Jančić, 1990). Scientific names and family assignments follow accepted botanical nomenclature. For each recorded species, the local (vernacular) name, plant part used, mode of preparation, and medicinal application were documented. Species were classified according to their use in traditional medicine, modern medicine and pharmacy, and toxicity, based on available literature and informant reports.

Ethnobotanical data were analysed using descriptive statistical methods. The frequency of citation for each species was calculated based on the number of informants who reported its use. Medicinal plant species were grouped according to their therapeutic applications, plant parts used, and harvesting periods. The proportion of species used exclusively in traditional medicine, those shared with modern medicine and pharmacy, and toxic species was determined.

Harvesting periods were analysed in relation to plant phenology, with particular emphasis on flowering and fruiting stages, in order to assess the ecological and empirical basis of traditional collection practices. The results were compared with previously published ethnobotanical and pharmacological studies from Montenegro and neighbouring regions.

## **RESULTS AND DISCUSSION**

The timing of medicinal plant collection on Bjelasica Mountain varies depending on altitude, exposure, and microclimatic conditions. Informants determine the optimal harvesting period primarily according to plant phenological stages observed on their own properties and surrounding habitats. These local indicators serve as practical guidelines for collecting plants even in remote mountain sites. In most cases, the reported harvesting periods coincide with those

described in scientific literature, particularly with the beginning of flowering, when the concentration of bioactive compounds is generally highest. This correspondence confirms the empirical ecological basis of traditional harvesting practices.



**Figure 3.** Blueberry pickers



**Figure 4.** Drying of medicinal herbs



**Figure 5.** Sorting and storage of medicinal herbs



**Figure 6.** Presentation of dried herbs



**Figure 7.** Exhibition and sale of tea in Bjelasica



**Figure 8.** Sales of tea on the market

Processing activities—including drying, sorting, storage, and marketing—are largely organized at the local level (Figures 3–8). Generational differences were evident: younger collectors tend to focus on fewer species with higher commercial value and greater abundance, whereas middle-aged and elderly informants possess broader ethnobotanical knowledge and more frequently collect plants for household and community healthcare purposes. Both men and women participate equally in collection activities.

A total of 102 medicinal plant species belonging to 44 families were recorded in the study area (Table 1). The most represented families are Lamiaceae and Asteraceae, which is consistent with floristic patterns observed in other mountainous regions of the Balkans. Their dominance reflects both ecological adaptability to diverse altitudinal belts and the high concentration of aromatic and bioactive compounds characteristic of these taxa.

When compared with ethnobotanical studies from other regions of Southeast Europe, the results show comparable richness. For example, 195 species were documented in the Ancona district (Central Italy), while 69 species were recorded in the Zlatibor district (Southwestern Serbia) and 136 taxa in Stara Planina (Southeastern Serbia). Although methodological differences and sample sizes vary, these comparisons confirm that Bjelasica Mountain represents an important regional centre of medicinal plant diversity and traditional knowledge. In the Ancona district, in the Marche region the ethnobotanical data concern medicinal (122 species), food (119), veterinary (53), superstitious/religious (61), cosmetic (30), domestic (27), dyeing (17), recreational (17), repellent (15), craft (10), and miscellaneous (29) uses, along with inclusion in local sayings and proverbs (25). The species with the greatest number of categories of use here was *Sambucus nigra* L. (Lucchetti *et al.* 2019). In the Zlatibor district, Southwestern Serbia, 220 informants (mean age 47 years, 79% female, 21% male) provided data for 69 medicinal plants belonging to 36 families (Šavikin *et al.* 2013), while in Southeast Serbia in Stara Planina the study identified 136 vascular medicinal plant taxa belonging to 53 families and 116 genera (Jarić *et al.*, 2024).

Species with the highest frequency of citation (Table 2) among informants include:

- *Ononis spinosa* L. (79.01%)
- *Taraxacum officinalis* Weber (79.01%)
- *Achillea millefolium* L. (60.49%)
- *Betula pendula* Roth. (60.49%)
- *Hypericum perforatum* L. (60.49%)
- *Primula acaulis* L. (60.49%)
- *Sambucus nigra* L. (60.49%)
- *Thymus serpyllum* L. (60.49%)
- *Tussilago farfara* L. (60.49%)
- *Viscum album* L. (60.49%)

These taxa exhibit high cultural importance and represent key elements of the local pharmacopoeia. A similar pattern was observed in Stara Planina (Serbia), where *Hypericum perforatum* and *Thymus serpyllum* also showed maximum use values (Jarić *et al.*, 2024), suggesting a broader Balkan ethnomedicinal core group of species.

**Table 1.** Plant families, species and parts used in traditional medicine

No Family	Plant species and folk names	Part(s) used	Usage
01 <i>Alijaceae</i>	<i>Allium ursinum</i> L. (bear's garlic)	leaf-folium	It eliminates toxins from the body, regulates blood pressure.
02 <i>Anacardiaceae</i>	<i>Cotinus coggygria</i> Scop (smoke bush)	leaf	It helps the thyroid gland function, treats bacteria in the urinary tract in children.
03 <i>Apiaceae</i>	<i>Angelica silvestris</i> L. (wild root, fruit angelica)		It treats urinary tract ailments, biliary disorders, and respiratory diseases.
	<i>Sanicula europaea</i> L. (wood sanicle)	root, herb	It is used for the treatment of wounds, as a remedy for diarrhoea.
	<i>Coriandrum sativum</i> L. (Coriander)	fruit	Abdominal pain
	<i>Foeniculum vulgare</i> Mill. (fennel)	fruit	Infections of the urinary tract.
	<i>Petroselinum crispum</i> (Mill.) Nym. (parsley)	leaf	Kidneys, prostate
04 <i>Aspleniaceae</i>	<i>Asplenium scolopendrium</i> L. (hart's-tongue fern)	herb, leaf, flower	Pancreas, diuretic
05 <i>Asteraceae</i>	<i>Achillea millefolium</i> L. (common yarrow)	leaf-folium	Skin complaints, coronary heart disease, immune system, external treatment of wounds, stomach problems.
	<i>Artemisia absinthium</i> L., (wormwood)	herb	Lungs, cancer, viral diseases
	<i>Calendula officinalis</i> L. (pot marigold)	flower	It treats fungi, diarrhoea, and it is used for making skin creams.
	<i>Cichorium intybus</i> L. (blue daisy)	Radix, rarely herb or flower	It treats diarrhoea, and recovers liver.
	<i>Inula helenium</i> L. (elecampane)	root	Lung, rheumatic disease. It prevents pneumonia and coughing.
	<i>Helianthus tuberosus</i> L. (sunroot)	leaf, root	Diabetes
	<i>Matricaria chamomila</i> L. (chamomile)	flower	It is used in tea blends, for mouthwash, for eye compresses, and as a tranquilizer.
	<i>Petasites hybridus</i> (L.) G.M. Sch. (butterbur)	leaf	It treats rheumatic ailments.
	<i>Silybum marianum</i> (L.) Gaertn. (milk thistle)	fruit	After cancer surgery, for liver cleanse
	<i>Solidago virgaurea</i> L. (true goldenrod)	herb	Inflammatory processes, urinary tract ailments, renal disorders, rheumatic diseases
	<i>Taraxacum officinalis</i> Weber. (dandelion)	root flower	For weakened immune system, lungs, after liver cancer surgery, dissolve gallstones in gallbladder
	<i>Tussilago farfara</i> L. (coltsfoot)	flower	Bronchitis, expectoration, tea blends

06	<i>Betulaceae</i>	<i>Betula pendula</i> Roth. (silver birch)	Betule succus, Folium, gema.	It cleanses blood, strengthens immunity, stimulates kidney function, for urinary tract problems, as a shampoo.
07	<i>Boraginaceae</i>	<i>Pulmonaria officinalis</i> L. (lungwort) <i>Symphytum officinale</i> L. (comfrey)	herb root	Lungs, respiratory organs, asthma Bone regeneration, varicose veins, fractures, hard-to-heal wounds, rheumatic diseases, lung diseases
08	<i>Brassicaceae</i>	<i>Armoracia rusticana</i> P.Gaertner, B.Mayer &Schreb (horseradish) <i>Capsella bursa-pastoris</i> L. (shepherd's purse)	root herb	Immunity, stomach, appetite Postpartal problems with bleeding, <i>Escherichia coli</i> bacteria, heart
09	<i>Caryophyllaceae</i>	<i>Silene vulgaris</i> Moench. Garcke. (bladder campion)	herb	<i>Escherichia coli</i> bacteria
10	<i>Corylaceae</i>	<i>Corylus avellana</i> L. (common hazel)	leaf	stomach pain and diarrhea treatment
11	<i>Cupressaceae</i>	<i>Juniperus communis</i> L. (common juniper)	fruit	Problem with the urinary tract, kidneys, glands, as a diuretic
12	<i>Ericaceae</i>	<i>Arctostaphylos uva-ursi</i> (L.) Spreng. (Bearberry) <i>Vaccinium myrtillus</i> L. (blueberry).	leaf, fruit fruit, leaf	Urinary tract infections, kidneys As a vitamin supplement. improves blood count. anti-diabetes effects, improves vision, boosts immunity.
13	<i>Equisetaceae</i>	<i>Equisetum arvense</i> L. (field horsetail)	herb	Urinary tract infection, prostate problems. abdominal pain. lung disease, anti-virus, fractures
14	<i>Euphorbiaceae</i>	<i>Euphorbia cyparissias</i> L, (cypress spurge)	herb	Wart removal
15	<i>Fabaceae</i>	<i>Anthyllis vulneraria</i> L. (common kidney vetch) <i>Phaseolus vulgaris</i> L. (common bean) <i>Robinia pseudacacia</i> L. (black locust) <i>Trifolium pratense</i> L. (red clover) <i>Ononis spinosa</i> L. (spiny restharrow)	flower, herb pods flower flower, herb radix	Helps in eliminating gallstones and kidney stones, for wound healing. It lowers blood sugar level. Lung tea, blended tea Estrogen, help manage menopause symptoms Mild diuretic/prostate, urinary tract infections, mayasil
16	<i>Fagaceae</i>	<i>Quercus cerris</i> L. (Turkey oak)	Cortex - bark	For the stomach, for better digestion and against constipation
17	<i>Gentianaceae</i>	<i>Centaurium umbellatum</i> Gilib. (European centaury) <i>Gentiana asclepiadea</i> L. (willow gentian) <i>Gentiana cruciata</i> L. (cross gentian) <i>Gentiana lutea</i> L. (bitterwort)	herb root herb root	It helps digestion, in helicobacter treatment. Treatment of digestive problems, fever, weight reduction Cirrhosis of the liver, fatty liver, persistent cough Stimulates appetite Dilutes blood, improves digestion; it is used in the treatment of heart disease.
18	<i>Geraniaceae</i>	<i>Geranium macrorrhizum</i> L. (bigroot geranium)	flower, leaf, rhizome	Fertility problems, after radiation therapy

19	<i>Hipericaceae</i>	<i>Hypericum perforatum</i> L. (perforate St John's-wort)	herb	Haemorrhoid's, nervous system problems, wounds, depression, as a balm
20	<i>Juglandaceae</i>	<i>Juglans regia</i> L. (walnut)	young leaf	For rinsing female reproductive organs, treating the tapeworms, gastrointestinal diseases
21	<i>Lamiaceae</i>	<i>Acinos alpinus</i> (L) Moench (rock thyme)	herb	Reduce high fever
		<i>Ballota nigra</i> L. (black horehound)	herb	Against hysteria, urinary incontinence
		<i>Glechoma hederacea</i> L. (ground-ivy)	herb	Respiratory system
		<i>Calamintha officinalis</i> Moench (pennyroyal)	herb	Anxiety, urinary incontinence
		<i>Melissa officinalis</i> L. (lemon balm)	leaf	As a tranquilizer, for headaches and migraines especially when triggered by stress.
		<i>Menta piperita</i> L. (Peppermint)	folium	For tea blends, upset stomach, as a tranquilizer
		<i>Origanum majorana</i> L. (majoran)	herb	Stimulates appetite
		<i>Origanum vulgare</i> L. (oregano)	herb	Inflammatory processes
		<i>Satureja montana</i> L. (winter savory)	herb	Peripheral blood circulation
		<i>Stachys officinalis</i> (L.) Trevis. (common hedgenettle)	herb	Bronchitis, wound healing
		<i>Teucrium chamaedrys</i> L. (wall germander)	herb	Against abdominal pain and diarrhea.
		<i>Teucrium montanum</i> L. (mountain germander)	herb	Strengthening immune system for digestive and respiratory systems
		<i>Thymus serpyllum</i> L. (breckland thyme)	herb	Upper respiratory infection, tea blends
22	<i>Loranthaceae</i>	<i>Viscum album</i> L. (mistletoe)	herb	For hypertension, prostate, milder forms of paresis, cholesterol, liver cirrhosis
23	<i>Lycopodiaceae</i>	<i>Lycopodium clavatum</i> L. (common club moss)	spore	It can treat liver cirrhosis, all prostate diseases, and peeled skin.
24	<i>Malaceae</i>	<i>Crataegus monogyna</i> L. (common hawthorn)	flower	Strengthens the heart muscle, lowers and regulates blood pressure.
25	<i>Malvaceae</i>	<i>Althaea officinalis</i> L. (marshmallow)	radix, leaf flower	Respiratory problems, stomach problems
		<i>Malva silvestris</i> L. (common mallow)	herb	Respiratory and bladder problems, for wound dressings
26	<i>Oenotheraceae</i>	<i>Epilobium angustifolium</i> L. (rosebay willowherb)	herb, folium	Bacteria. swellings, and prostate, bladder, and kidney's diseases
27	<i>Papaveraceae</i>	<i>Chelidonium majus</i> L. (greater celandine)	herb, radix	It treats warts, lichen planus, early stage of cataracts, liver diseases. It is used as a narcotic.
28	<i>Parmeliaceae</i>	<i>Cetraria islandica</i> Achar. (Iceland lichen)	dried talus	Lung diseases, viruses

29	<i>Pinaceae</i>	<i>Pinus sylvestris</i> L. (Scots pine)	tips of the saplings	Bronchial tubes
30	<i>Plantaginaceae</i>	<i>Plantago lanceolata</i> L. (ribwort plantain)	seed, folium	Hemorrhoids, prostate, esophagus. Treat acute and chronic bronchitis, but not the allergic one.
		<i>Plantago major</i> L. (broadleaf plantain)	folium	Coughing and bronchitis
		<i>Plantago media</i> L. (Hoary plantain)	folium	Bronchitis, wounds
31	<i>Poaceae</i>	<i>Avena sativa</i> L. (common oat)	tips of the saplings	Bronchial tubes, cholesterol.
		<i>Zea mays</i> L. (corn)	Maydis stigma	Mild diuretic; relieves rheumatic pain.
32	<i>Polygonaceae</i>	<i>Polygonum aviculare</i> L. (common knotgrass)	herb	Prostate, urinary tract infection, kidney stones, lung disease
		<i>Polygonum bistorta</i> L. (bistort, snakeroot)	rhizome	Diarrheal, heart, stinking wounds
33	<i>Primulaceae</i>	<i>Anagallis arvensis</i> L. (scarlet pimpernel)	herb	Eye problems
		<i>Primula acaulis</i> L. (common primrose)	flower	Stomach, lungs, coughing, heart problems
		<i>Primula elatior</i> L. (oxlip)	flower	Lungs
		<i>Primula veris</i> Huds (cowslip)	Radix, flower	Lungs
34	<i>Rhamnaceae</i>	<i>Rhamnus franeula</i> L. (alder buckthorn)	bark	Cleansing the body, treats constipation and other digestive problems
35	<i>Rosaceae</i>	<i>Agrimonia eupatoria</i> L. (agrimony)	herb	Kidneys, liver, gall bladder, break up stones in the kidney
		<i>Alchemilla vulgaris</i> L. (common lady's mantle)	herb	Fertility, female diseases, female reproductive system. Diarrhea, wounds.
		<i>Cydonia oblonga</i> Mill. (quince)	leaf, fruit	Diarrhea
		<i>Fragaria vesca</i> L. (wild strawberry)	leaf	Respiratory system disorders, diarrhea, heartburn, bleeding
		(wood avens) <i>m</i> L. (wood avens)	Radix, herb	Energising preparations
		<i>Rosa canina</i> L. (dog rose)	fruit	Vitamin C, immunity, colds, inflammation
		<i>Rubus caesius</i> L. (dewberry)	leaf, fruit	Boost immunity, inflammatory processes in the throat, Diarrhea
<i>Rubus idaeus</i> L. (raspberry)	leaf	Antidiarrheal, mouthwash, source of vitamins		
<i>Sorbus aucuparia</i> L. (mountain-ash)	fruit	Source of vitamins, flower tea for liver diseases, cough hemorrhoids		
36	<i>Rubiaceae</i>	<i>Asperula odorata</i> L. (sweet woodruff)	herb	Respiratory system disorders, gall bladder problems, skin diseases, liver, diuretic
		<i>Galium verum</i> L. (lady's bedstraw)	herb	Diuretic, for heart disease, sedative
37	<i>Salicaceae</i>	<i>Salix alba</i> L. (white willow)	bark	Calming, convulsions, insomnia, fever

38	<i>Sambucaceae</i>	<i>Sambucus nigra</i> L. (black elder)	flower, fruit	Colds, antivirals, urinary tract, cause Diarrhea
39	<i>Scrophulariaceae</i>	<i>Euphrasia rostkoviana</i> Hayek. (eyebright)	herb	Eye inflammation, for nasal irrigation
		<i>Scrophularia nodosa</i> L. (figwort)	herb, radix	Hemorrhoid's, tumors, stimulates appetite
		<i>Verbascum phlomoides</i> L. (orange mullein)	flower	Pulmonary diseases, respiratory tract, cough, bronchitis
		<i>Veronica officinalis</i> L. (heath speedwell)	herb	A medicine for strengthening, against nervousness, for treating the liver and gall bladder.
40	<i>Thymelaeaceae</i>	<i>Daphne blagayana</i> Frey. (Blagay's daphne)	Bark, flower	Externally in tumors, rheumatism
41	<i>Tiliaceae</i>	<i>Tilia platyphyllos</i> Scop. (large-leaved lime)	flower	Relieves cough irritation, feverish colds that require sweating, nervous tension
42	<i>Urticaceae</i>	<i>Urtica dioica</i> L. (common nettle, stinging nettle)	leaf, seed	Anemia, immunity, menstrual complaints, rheumatism
43	<i>Valerianaceae</i>	<i>Valeriana officinalis</i> L. (Valerian, Garden heliotrope)	root	For soothing, fever
44	<i>Violaceae</i>	<i>Viola odorata</i> L. (wood violet, sweet violet)	Flower	Lung diseases, coughing, sore throat,
		<i>Viola tricolor</i> L. (wild pansy, Johnny Jump up, heartsease)	herb	Skin diseases, for rinsing with sore throats and colds.
Σ	44 families	102 species		

The aerial parts of plants during flowering are most frequently harvested. Herb (entire aboveground part) is collected from 32 species (31.37%), leaves from 14 species (13.72%), and flowers from 9 species (8.82%). Root and bark harvesting occurs less frequently but is of greater ecological concern due to its destructive impact on plant survival.

Of the 102 recorded species:

- 58 species (59.16%) are used exclusively in traditional medicine
- 34 species (34.68%) are used both in traditional medicine and modern pharmacy
- 4 species are classified as toxic but used traditionally (T/P)
- 6 species are both pharmacologically recognized and toxic (MPh/T/P)

The relatively high proportion of species shared between traditional and modern medicine (34.68%) indicates strong concordance between empirical knowledge and scientifically validated therapeutic properties. This overlap confirms that local ethnomedicinal practices are largely grounded in long-term experiential selection of effective taxa.

Some plants (10) used in traditional medicine contain poisonous substances, which can cause adverse reactions if the plants are not processed professionally. According to Šarić *et al.* (1989) *Anagallis arvensis* L. has a harmful effect as it is a narcotic poison. *Artemisia absinthium* L. has a beneficial effect if used in small doses.

Due to the toxicity of thujone, some countries have forbidden the use of wormwood alcoholic extracts in the production of alcoholic beverages based on wormwood essential oil. *Chelidonium majus* L. is a spicy narcotic poison and in a large dose can be lethal.

*Daphne blagayana* Frey is very toxic if used too often and unprofessionally. *Euphorbia cyparissias* L. while fresh contains spicy milk that can cause inflammation and blisters. *Equisetum arvense* L. toxic alkaloids can cause bloody diarrhoea and bloody urination in case of irrational use. Hypericin, the constituent of *Hypericum perforatum* L. or St. John's wort, increases the sensitivity of skin to sunlight, so that people with fair skin can develop inflammation similar to that of sunburn. Moreover, St. John's wort berries are poisonous.

Although traditional knowledge includes awareness of dosage limitations, improper preparation or commercialization without professional guidance may pose health risks.

Market demand significantly influences harvesting pressure. A notable example is *Scrophularia nodosa*, which experienced a temporary surge in demand following claims of anti-cancer properties that were not scientifically confirmed. Such trends may lead to overharvesting and resource depletion.

Species harvested for roots or bark, such as *Gentiana lutea* or *Quercus cerris*, require particular attention due to the destructive nature of collection. Sustainable harvesting strategies and potential cultivation initiatives should therefore be prioritized.

The ecological conditions of the locality and the biological properties of the plants themselves determine the representation of individual plant families in the area. In Bjelasica Mt., the altitude difference between the sites is 1,569 m above sea level (2139 m-570=1569 m,) with several types of climates, from temperate continental to alpine climate.

For instance, *Gentiana lutea* is most abundant above 1000 m a.s.l., where environmental conditions favour higher concentrations of bioactive compounds. Similarly, *Vaccinium myrtillus* occupies acidic soils along a broad altitudinal gradient (650–2000 m a.s.l.). These patterns demonstrate the close relationship between mountain ecology and ethnomedicinal practices.

Generational differentiation in plant use suggests gradual erosion of comprehensive traditional knowledge. While younger collectors are economically oriented, older informants retain broader therapeutic applications. Without systematic documentation and knowledge transfer, this intangible heritage may decline.

A special danger for the preservation of natural resources is the sensational attribution of healing power to certain plants, especially in the treatment of serious diseases. About ten years ago, such a power was attributed to a black nettle (*Scrophularia nodosa* L.) in the treatment of malignant diseases. Its value and use have increased sharply in the market. As the science has not confirmed its value, the demand for it in Bjelasica Mt. has declined over time. Many traditional healers (60.49%) harvest *Achillea millefolium* L., *Betula pendula* Roth., *Hypericum perforatum* L., *Primula acaulis* L., *Sambucus nigra* L., *Thymus serpyllum* L., *Tussilago farfara* L., *Viscum album* L.

**Table 2.** The use of plants in traditional medicine

The collected species	Usage T-traditional medicine MPh- pharmacy P-poisonous	Number of study participant s	Annual	Biennial	Perenn ial	H- herbaceous W-woody plants S-shrub
<i>Achillea millefolium</i> L. (common yarrow)	MPh/T	60.49%			+	h
<i>Acinos alpinus</i> (L) Moench (rock thyme)	T	19.75%			+	h
<i>Agrimonia eupatoria</i> L. (agrimony)	T	11.11%			+	h
<i>Alchemilla vulgaris</i> L. (common lady's mantle)	MPh/T	30.86%			+	h
<i>Allium ursinum</i> L. (bear's garlic)	T	19.75%			+	h
<i>Althaea officinalis</i> L. (marshmallow)	T	11.11%			+	h
<i>Anagallis arvensis</i> L. (scarlet pimpernel)	P/T	1.23%	+			h
<i>Angelica silvestris</i> L. (wild angelica)	T	1.23%		+	+	h
<i>Anthyllis vulneraria</i> L. (common kidney vetch)	T	1.23%	+	+	+	h
<i>Arctostaphylos uva-ursi</i> (L.) Spreng (bearberry)	MPh/T	19.75%			+	evergreen shrub
<i>Artemisia absinthium</i> L. (wormwood)	MPh/T/P	19.75%			+	R/w Arial parts/h Semi shrub
<i>Armoracia rusticana</i> P.Gaertner, B.Mayer & Schreb (horseradish)	T	4.94%			+	h
<i>Asperula odorata</i> L. (sweet woodruff)	MPh/T	4.94%			+	h
<i>Asplenium scolopendrium</i> L. (hart's-tongue fern)	T	4.94%			+	h
<i>Avena sativa</i> L. (common oat)	T	1.23%	+			h
<i>Ballota nigra</i> L. (black horehound)	T	11.11%			+	h
<i>Betula pendula</i> Roth. silver birch)	MPh/T	60.49			+	w
<i>Calamintha officinalis</i> Moench (pennyroyal)	T	1.23%			+	h
<i>Calendula officinalis</i> L. (pot marigold)	T	11.11%	+	rarely		h
<i>Capsella bursa-pastoris</i> L. (shepherd's purse)	MPh/T	44.44		+		h

<i>Cetraria islandica</i> Achar. (Iceland lichen)	MPh/T	1.23%				lichen
<i>Centaureum umbellatum</i> Gilib. (European centaury)	MPh/T	30.86%	+	+		h
<i>Chelidonium majus</i> L. (greater celandine)	MPh/T/P	19.75%			+	h
<i>Cichorium intybus</i> L. (blue daisy)	MPh/T	19.75%			+	
<i>Coriandrum sativum</i> L. (coriander)	T	1.23%	+			h
<i>Corylus avellana</i> L. (common hazel)	T	1.23%			+	w
<i>Cotinus coggygria</i> Scop (smoke bush)	T	11.11%			+	w
<i>Crataegus monogyna</i> L. (common hawthorn)	MPh/T	44.44			+	tree
<i>Cydonia oblonga</i> Mill. (quince)	T	1.23%			+	w
<i>Daphne blagayana</i> Frey. (Blagay's daphne)	MPh/T/P	11.11%				shrub-w
<i>Equisetum arvense</i> L. (field horsetail)	MPh/T/P	44.44			+	h
<i>Enilobium aneustifolium</i> L. (rosebay willowherb)	T	44.44			+	h
<i>Euphorbia cyparissias</i> L., (cy press spurge)	T/P	1.23%			+	h
<i>Euphrasia rostkoviana</i> Hayek. (eyebright)	T	4.94%	+			h - parasite
<i>Foeniculum vulgare</i> Mill. (fennel)	T	1.23%			+	h
<i>Fragaria vesca</i> L. (wild strawberry)	T	1.23%			+	h
<i>Galium verum</i> L. (lady's bedstraw)	T	1.23%			+	h
<i>Gentiana asclepiadea</i> L. (willow gentian)	T	30.86%			+	h
<i>Gentiana cruciata</i> L. (cross gentian)	MPh/T	1.23%			+	h
<i>Gentiana lutea</i> L. (bitterwort)	MPh/T	11.11%			+	h
<i>Geranium macrorrhizum</i> L. (bigroot geranium)	T	11.11%			+	h
<i>Geum urbanum</i> L. (wood avens)	T	1.23%			+	h
<i>Glechoma hederacea</i> L. (ground- ivy)	T	1.23%			+	h
<i>Helianthus tuberosus</i> L. (sunroot)	T	1.23%			+	h
<i>Hypericum perforatum</i> L. (perforate St John's-wort)	MPh/T/P	60.49%			+	h
<i>Inula helenium</i> L. (elecampane)	MPh/T	19.75%			+	h
<i>Juglans regia</i> L. (walnut)	T	11.11%			+	W
<i>Juniperus communis</i> L. (common juniper)	MPh/T	11.11%			+	w
<i>Lycopodium clavatum</i> L. (common club moss)	MPh/T	11.11%				

<i>Malva silvestris</i> L. (common mallow)	T	4.94%		+	+	Woody at the lower part
<i>Matricaria chamomila</i> L. (chamomile)	MPh/T	19.75%	+			h
<i>Melissa officinalis</i> L. (lemon balm)	MPh/T	44.44			+	h
<i>Menta piperita</i> L. (peppermint))	MPh/T	19.75%			+	h
<i>Ononis spinosa</i> L. (spiny restharrow)	MPh/T	79.01%			+	h
<i>Origanum majorana</i> L. (majoran)	T	1.23%			+	h
<i>Origanum vulgare</i> L. (oregano)	MPh/T	11.11%			+	h
<i>Petasites hybridus</i> (L.) G.M. Sch. (butterbur)	T/P	1.23%			+	h
<i>Petroselinum crispum</i> (Mill.) Nym. (parsley)	T	4.94%		+		h
<i>Phaseolus vulgaris</i> L. (common bean)	<u>T</u>	1.23%	+			h
<i>Pinus sylvestris</i> L. (Scots pine)	T	11.11%			+	w
<i>Plantago lanceolata</i> L. (ribwort plantain)	T	4.94%			+	h
<i>Plantago major</i> L. (broadleaf plantain)	T	30.86%	+	+	+	h
<i>Plantago media</i> L. (Hoary plantain)	T	1.23%			+	h
<i>Polygonum aviculare</i> L. (common knotgrass)	MPh/T	11.11%	+			h
<i>Polygonum bistorta</i> L. (bistort, snakeroot )	T	1.23%			+	h
<i>Primula acaulis</i> L. (common primrose)	T	60.49%			+	h
<i>Primula elatior</i> L. (oxlip)	MPh/T	1.23%			+	h
<i>Primula veris</i> Huds (cowslip)	MPh/T	4.94%			+	h
<i>Pulmonaria officinalis</i> L. (lungwort)	T	30.86%			+	h
<i>Quercus cerris</i> L. (Turkey oak)	MPh/T	4.94%			+	w
<i>Rhamnus frangula</i> L. (alder buckthorn)	T	4.94%			+	w
<i>Robinia pseudacacia</i> L. (black locust)	T	1.23%			+	w
<i>Rosa canina</i> L. (dog rose)	MPh/T	4.94%			+	w-shrub
<i>Rubus caesius</i> L. (dewberry)	T	19.75%			+	w-shrub
<i>Rubus idaeus</i> L. (raspberry)	T	19.75%			+	w-shrub
<i>Salix alba</i> L. (white willow)	MPh/T	19.75%			+	w
<i>Sambucus nigra</i> L. (black elder)	T	60.49%			+	w

<i>Sanicula europaea</i> L. (wood sanicle)	T	1.23%			+	w
<i>Satureja Montana</i> L. (winter savory)	T	19.75%			perennial	semibush
<i>Scrophularia nodosa</i> L. (figwort)	T	4.94%			+	h
<i>Silene vulgaris</i> (Moench) Garcke. (bladder campion)	T	1.23%				h
<i>Silybum marianum</i> (L.) Gaertn. (milk thistle)	T	1.23%	+ or	+ over winter		
<i>Solidago virgaurea</i> L. (true goldenrod)	MPh/T	11.11%			+	
<i>Sorbus aucuparia</i> L. (mountain-ash)	T	1.23%			+	w
<i>Stachys officinalis</i> (L.) Trevis. (common hedgenettle)	T	11.11%			+	h
<i>Symphytum officinale</i> L. (comfrey)	T/P	44.44			+	semishrub
<i>Taraxacum officinalis</i> Weber. (dandelion)	MPh/T	79.01%			+	h
<i>Teucrium chamaedrys</i> L. (wall germander)	T	44.44			+	semishrub
<i>Teucrium montanum</i> L. (mountain germander)	T	44.44			+	h
<i>Thymus serpyllum</i> L. (breckland thyme)	MPh/T	60.49%			+	h
<i>Tilia platyphyllos</i> Scop. (large-leaved lime)	T	1.23%			+	w
<i>Trifolium pratense</i> L. (red clover)	T	19.75%				h
<i>Tussilago farfara</i> L. (coltsfoot)	MPh/T/P	60.49%			+	h
<i>Urtica dioica</i> L. (common nettle, stinging nettle)	MPh/T	44.44			+	h
<i>Vaccinium myrtillus</i> L. (blueberry)	MPh/T	44.44			+	evergreen
<i>Valeriana officinalis</i> L. (Valerian, Garden heliotrope)	MPh/T	30.86%			+	h
<i>Verbascu phlomoides</i> L. (orange mullein)	T	30.86%		+		h
<i>Veronica officinalis</i> L. (heath speedwell)	T	4.94%	+	+	+	h
<i>Viola odorata</i> L. (wood violet, sweet violet)	T	30.86%			+	h
<i>Viola tricolor</i> L. (wild pansy, Johnny Jump up, heartsease)	MPh/T	11.11%	+		+	h
<i>Viscum album</i> L. (mistletoe)	MPh/T 14	60.49%			+	(80) evergreen shrub
<i>Zea mays</i> L. (corn)	T 8	1.23%	+			h

A total of 102 plant species are used in traditional medicine.						
T 102 species	58	59,16%				
MPh/T 34 species	34	34,68				
T/P 4 species						
MPh/T/P 6 species	10	9,80				

A large proportion of informants (79.01%) reported harvesting a core group of species, including *Achillea millefolium*, *Betula pendula*, *Hypericum perforatum*, *Primula acaulis*, *Sambucus nigra*, *Thymus serpyllum*, *Tussilago farfara*, and *Viscum album*, indicating their high cultural and therapeutic importance.

Similar patterns have been documented in other mountainous regions of the Western Balkans, such as Stara Planina (Serbia), where *Gentiana lutea*, *Hypericum perforatum*, and *Thymus serpyllum* were also among the most frequently cited species (Jarić *et al.*, 2024). This recurrence suggests a shared ethnomedicinal framework shaped by comparable ecological and cultural conditions.

The considerable proportion of species used both in traditional medicine and modern pharmacy confirms a strong correspondence between empirical knowledge and scientifically validated properties. However, the presence of toxic taxa and increased market demand for certain species highlight the need for careful management and sustainable harvesting. Ecological factors, particularly altitude and soil conditions, significantly influence species distribution and quality, further emphasizing the importance of site-specific knowledge in traditional plant use.

## CONCLUSIONS

This study provides comprehensive ethnobotanical documentation of medicinal plants used in traditional medicine on Bjelasica Mountain, Montenegro. A total of 102 plant species belonging to 44 families were recorded, confirming the exceptional floristic richness of the region and its importance as a reservoir of traditional ecological knowledge. The predominance of species from the families Lamiaceae, Asteraceae, and Rosaceae reflects both the ecological characteristics of the mountain and the long-term empirical selection of therapeutically effective taxa.

The timing of collection activities is closely aligned with plant phenology and altitude-dependent vegetation dynamics. Harvesting periods largely coincide with the stages described in the scientific literature, particularly the beginning of flowering, when the concentration of biologically active compounds is considered highest. This alignment demonstrates that local collectors rely on accumulated empirical knowledge linked to seasonal indicators and developmental stages of vegetation, confirming the ecological grounding of traditional harvesting practices.

The relatively high proportion of species used both in traditional medicine and in modern pharmacy (34.7%) indicates substantial concordance between

local ethnomedicinal knowledge and scientifically validated therapeutic properties. Species such as *Ononis spinosa*, *Taraxacum officinale*, *Achillea millefolium*, *Hypericum perforatum*, *Sambucus nigra*, *Thymus serpyllum*, and *Tussilago farfara* exhibit particularly high cultural importance, as reflected by their frequent citation among informants, and represent priority taxa for further phytochemical and pharmacological investigation.

Socio-economic patterns reveal generational differences in plant use: younger collectors predominantly harvest species of higher commercial value, whereas older informants retain broader knowledge of plants used for household and community healthcare. This differentiation highlights the ongoing risk of erosion of traditional knowledge and underscores the importance of systematic documentation and intergenerational knowledge transfer.

From a conservation perspective, the intensive collection of certain high-demand species, particularly those harvested for roots or bark, raises concerns regarding long-term sustainability. The documented use of toxic species further emphasizes the need for education, professional guidance, and regulatory oversight to prevent adverse health effects and ecological degradation. Sustainable harvesting strategies, cultivation initiatives, and integration of traditional knowledge into conservation planning are essential to ensure the preservation of medicinal plant diversity on Bjelasica Mountain.

Overall, this research establishes a valuable baseline for future interdisciplinary studies linking ethnobotany, mountain ecology, pharmacology, and rural development. By documenting species diversity, phenological harvesting patterns, and socio-economic dynamics, the study contributes to the safeguarding of both biological resources and intangible cultural heritage in mountainous regions of the Western Balkans.

## REFERENCES

- Baldaći, A. (1892). Altre notizie intorno alla Flora del Montenegro. *Malpighia*, Genova: Tip. Di Angelo Ciminago, 6, 1-123.
- Balijagić, J.; Jovančević, M.; Vreva, M. (2010). Atlas of medicinal plants of the Bjelo Polje region. *Merkator Internacional*, Bijelo Polje,
- Balijagić, J.; Markišić, H.; Jovančević, M.; Prašćević, M.; Vincek, D.; Menković, N. (2012). Contribution to the research of medicinal and other plants in the mountainous region of Čakor, Montenegro. *Agriculture & Forestry*, 57, 3, 67-92.
- Blečić, V.; Lakušić, R. (1970). Der Urwald Biogradska Gora in Gebirge Bjelasica in Montenegro. *Academy of Sciences and Arts of BiH - Special edition*, 1970, 15(4), 131-140
- Bojović R.J.; Dostjan S.I. (1992). Montenegrin-Russian relations 1711-1918. Russian sources about Montenegro from the end of the 17<sup>th</sup> to the middle of the 19<sup>th</sup> century, pp. 143-176. *Historical Institute of Montenegro. Institute of Slavic Studies and Balkan Studies of the Academy of Sciences of the USSR*, Podgorica-Moscow, 1992.
- Curović M.; Stesević, D.; Medarević, M.; Cvjeticanin, R.; Pantić, D.; Spalević, V. (2011). Ecological and structural characteristics of monodominant montane beech forests in the national park Biogradska Gora-Montenegro, *Archives of biological sciences*, 63 (2), 429-440.

- Čurović, M. (2011). Forest types in the national park 'Biogradska gora'. Doctoral dissertation, University of Belgrade, Faculty of Forestry, Belgrade, 2011.
- Čurović, M., Bugarin, D., Motta, R., Gazdić, M., & Medarević, M. (2025). Structural characteristics of old-growth forest of silver fir and beech at Biogradska Gora. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*, 53(4), 14807. <https://doi.org/10.15835/nbha53414807>
- Fuštić B. (1991). Soils of the National Park "Biogradska Gora" Natural and social values of the National Park "Biogradska Gora"; 75-100. CANU; Podgorica.
- Jančić R. (1990). Medicinal plants with a key for identification. Naučna knjiga, Beograd,
- Jarić, S., Kostić, O., Miletić, Z. *et al.* (2024). Ethnobotanical and ethnomedicinal research into medicinal plants in the Mt Stara Planina region (south-eastern Serbia, Western Balkans). *J Ethnobiology Ethnomedicine* 20, 7 <https://doi.org/10.1186/s13002-024-00647-2>
- Josifović, M.; Jovanović, B.; Jovanović-Dunjić, R.; Gajić, M.; Nikolić, B.; Slavnić, Ž.; Diklić, N.; Cincović, T.; Cincović, T.; Kojić, M.; Janković, M.M.; Stjepanović-Veselić, A.; (1970-1977). *Flora of Serbia*, I-X, Serbian Academy of Sciences and Arts, Beograd.
- Jovančević, M.; Balijagić, J.; Menković, N.; Šavikin, K.; Zdunić, G.; Janković, T.; Ivanković-Dekić, M. (2011). Analysis of phenolic compounds in wild populations of bilberry (*Vaccinium myrtillus* L.) from Montenegro.- *Journal of Medicinal Plants Research*, 5(6): 910-914.
- Krivokapić, S.; Pejatović, T. Effect of the vegetation cycle on total phenolic and flavonoid compounds in *Hypericum perforatum* L. and *Melissa officinalis* L. collected in Montenegro. *Agriculture and Forestry*, 2021, 67 (1): 181-190.
- Lakušić, D.; Lakušić, R.; Stevanović, V. (1991). The natural system of the Bjelasica mountain ecosystem; Natural and social values of the national park "Biogradska gora", CANU; Podgorica,
- Lakušić, R. (1990). Mountain plants. Svjetlost, Institute for textbooks and teaching, Sarajevo - Institute for textbooks and teaching, Belgrade,
- Lakušić, R.; Atanacković, B.; Vučković, M. (1991). Endemic flora of Kopaonik and Bjelasica; Natural and social values of the national park "Biogradska gora"; CANU; Podgorica, 1991.
- Lakušić, R.; Milojević, M. (1972). Medicinal plants on the mountains of Prokletije, Komovi and Bjelasica. *Tokovi*, Ivangrad, 91-110.
- Leporatti, M., Ivancheva, C. (2003). Preliminary comparative analysis of medicinal plants used in the traditional medicine of Bulgaria and Italy. *Journal of Ethnopharmacology*. 87 (2-3), 123-142.
- Lucchetti, L., Zitti, S. & Taffetani, F. (2019). Ethnobotanical uses in the Ancona district (Marche region, Central Italy). *J Ethnobiology Ethnomedicine* 15, 9 <https://doi.org/10.1186/s13002-019-0288-1>
- Menković R. N. (1997). Phytochemical testing of in vitro species cultures *Gentiana lutea* L. and *Gentiana punctata* L. Doctoral dissertation, Faculty of Pharmacy, University of Belgrade.
- Menković, N.; Šavikin, K.; Tasić, S.; Zdunić, G.; Stešević, D.; Milosavljević, S.; Vinček D. (2011). Ethnobotanical study on traditional uses of wild medicinal plants in Prokletije Mountains (Montenegro). *Journal of ethnopharmacology.*, 133, 1, 97-107,
- Milosevic, R.; Curovic, M.; Novakovic-Vukovic M. (2019). Analysis of the floristic composition of mountain beech forests on the territory of Serbia and Montenegro. *Fresenius environmental bulletin*, 28 (8), 5727-5733.

- Motta R, Alberti G, Ascoli D, Berretti R, Bilic S, Bono A, Milic C, Vojislav D, Finsinger W, Garbarino M, Govedar Z, Keren S, Meloni F, Ruffinatto F and Nola P (2024). Old-growth forests in the Dinaric Alps of Bosnia-Herzegovina and Montenegro: a continental hot-spot for research and biodiversity. *Front. For. Glob. Change* 7:1371144. doi: 10.3389/ffgc.2024.1371144
- Mullalija, B., Mustafa, B., Hajdari, A. *et al.* (2021). Ethnobotany of rural and urban Albanians and Serbs in the Anadrini region, Kosovo. *Genet Resour Crop Evol* 68, 1825–1848. <https://doi.org/10.1007/s10722-020-01099-9>
- Muravjov N. (1940). The vegetation of the Bjelasica Mountain. *Glasnik Skopskog naučnog društva* 22(8), 55–63.
- Novak F. (1932). *Pini heldreichii* Crist. *Stationes novae* (Prag), 11, 73-75.
- Pieroni A. (2008). Local plant resources in the ethnobotany of Theth, a village in the Northern Albanian Alps. *Genet Resour Crop Evol* 2008, 55, 1197–1214.
- Pulević V. (1980). Overview of medicinal and other useful plant species in the flora of Montenegro. Elaborate in the fund of the Republic Institute for Nature Protection of Montenegro, Titograd.
- Pulević, V. (1965). Contribution to the knowledge of medicinal plants in the flora of Montenegro, their utilization and protection. *Agriculture and Forestry*, 11 (3-4), 7-48.
- Rohlena J. (1942) *Conspectus florae Montenegriane*. – *Preslia* 20–21: 3–506
- Sarić M. (1989). Medicinal plants of SR Serbia. Serbian Academy of Sciences and Arts, Special editions, 598; Department of Natural and Mathematical Sciences (Series), Vol. 65.
- Šavikin, K.; Zdunić, G.; Menković, N.; Zivković, J.; Čujić, N.; Terešćenko, M.; Bigović, D. (2013). Ethnobotanical study on traditional use of medicinal plants in South-Western Serbia, Zlatibor District. *Journal of Ethnopharmacology*, 146, 3, 803-810.
- Šilić, Č. (1983). Forest herbaceous plants. *Svjetlost*, Institute for textbooks, Belgrade: Institute for textbooks, Sarajevo,
- Šilić, Č. (1984). Endemic plants. *Svjetlost*, Institute for textbooks, Belgrade: Institute for textbooks, Sarajevo.
- Stešević, D.; Petrović D. (2003). Rare, Endangered and Protected Plants of Mountain Bjelasica; Monographs No 1, Biodiversity of The Biogradska Gora National Park, Ed. Pesic, V.; Karaman, G.; Spalevic, V.; Jovovic, Z.; Langurov, M. Department of Biology, University of Montenegro; Podgorica.