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ADDITIONS TO THE PHYTOSOCIOLOGICAL COMPOSITION OF *EPILOBION ANGUSTIFOLII* OBERD. 1957 IN MT. LUBOTEN, SHARRI MTS.

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This study provides a detailed phytosociological analysis of the *Telekietum speciosae* Tregubov 1941 association, a pioneer plant community found on Mt. Luboten in the Sharri Mountains, Kosovo. Using 18 original relevés and comparisons with existing data from Austria, this research examines the composition, syntaxonomy, and chorology of the community. The analysis reveals significant differences in the floristic composition and ecological conditions between the Mt. Luboten relevés and those from the Austrian Alps, highlighting the impact of geographical isolation and local environmental factors. The *Telekietum speciosae* community on Mt. Luboten is predominantly composed of hemicryptophytes, indicating its adaptation to cold-temperate climates with marked seasonal changes. The chorological spectrum is dominated by Euro-Asiatic and Circumboreal species, reflecting the biogeographical history and environmental conditions of the region. This study emphasizes the ecological significance of *Telekietum speciosae* in forest succession and underlines the need for a comprehensive database of relevés to support comparative studies across Europe. Such research is crucial for understanding the evolutionary processes shaping pioneer plant communities and for guiding conservation strategies aimed at preserving biodiversity in mountain ecosystems.

Key words: synanthropic vegetation; nitrophilous fringe vegetation; *Telekietum speciosae*; Kosovo; ecological succession; pioneer plant communities

INTRODUCTION

Plant communities are fundamental units of ecosystems that provide insights into the interactions between species and their environment [1–3]. Understanding the composition, structure, and dynamics of these communities is crucial for the study of ecology, biogeography, and conservation biology [4, 5]. In temperate regions, plant communities have been extensively classified to capture the diversity of habitats and successional stages in response to environmental gradients and disturbances [6].

Plant communities, also referred to as "plant associations," reflect the complex interactions between species and their environment [7]. A plant association is a specific grouping of plant species that consistently occurs together in a particular habitat under similar environmental conditions [8]. These associations are defined by a dominant species or a combination of species that shape the overall structure and function of the community [9]. Ecologists and biogeographers use plant associations to classify and understand vegetation patterns, successional stages, and the ecological processes that shape natural landscapes.

A significant subset of plant communities consists of pioneer plant communities that emerge following disturbances such as fire, deforestation, or soil disruption. These communities play a vital role in ecological succession, as they initiate the process of habitat restoration by stabilizing the soil and creating favorable conditions for subsequent vegetation.

Among the pioneer communities, those belonging to the vegetation alliance *Epilobion angustifolii* Oberd. 1957 (from the Order *Galeopsio-Senecionetalia sylvatici* Passarge 1981 and the Class *Epilobietea angustifolii* Tx. et Preising ex von Rochow 1951) are particularly noteworthy. First described by Erich Oberdorfer in 1957, the *Epilobion angustifolii* alliance centers around the dominance of *Epilobium angustifolium* L., commonly known as fireweed [10]. This species is renowned for its ability to rapidly colonize disturbed sites and form dense stands, contributing significantly to the early stages of ecological succession in temperate ecosystems [11].

The alliance comprises tall-herb perennial, semi-natural vegetation found on acidic soils at forest margins and in forest clearings within the boreal and nemoral zones of Europe [12]. It includes plant communities that thrive on oligotrophic, predominantly acidic soils within the zone of forest communities classified under the Classes *Quercetea robori-petraeae* Br.-Bl. et Tx. ex Oberd. 1957 and *Carpino-Fagetea sylvaticae* Jakucs ex Passarge 1968 (particularly the Alliance *Fagion sylvaticae* Luquet 1926), among other syntaxonomic groups.

In the literature available for Kosovo, eight associations of this alliance have been reported [13, 14]. The most important and widespread among them, especially in forest clearings affected by wildfires, is the association *Epilobietum angustifolii* Soó 1940. In earlier literature [13, 14], the order *Atropetalia belladonae* Vlieger 1937 was recognized as a separate entity, within which the alliance *Chamaenerion angustifolii* Soó 1933 was distinguished. However, it has since been reclassified [12] as a synonym of the alliance *Epilobion angustifolii* Oberd. 1957. Accordingly, these associations have been reassigned under *Epilobion angustifolii*, and include the following plant associations: 1º *Epilobietum angustifolii* Soó 1940; 2º *Luzulo-Rubetum tomentosae* Vukičević 1965; 3º *Atropetum belladonae* Br.-Bl. 1930; 4º *Euphorbieto (cyparissias)-Brachypodietum pinnati* Vukičević 1965; 5º *Calamintha acinos-Mentha thymifolia* Vukičević 1965; 6º *Achilleeto-Salicetum mixtum* Vukičević 1954; 7º *Sambucetum racemosae* (Noirfolk 1949) Oberd 1973; and 8º *Telekietum speciosae* Tregubov 1941.

Telekietum speciosae Tregubov 1941 is a plant community that thrives on forest edges, typically on moist soils above the beech forests of the sub-montane belt (*Fagetum montanum* s.l.). This community is characterized by lush formations of tall herbaceous plants that flourish on moist, humus-rich soils near mountain streams or in proximity to beech forests. It is widely distributed across Europe in similar habitats and plays a crucial ecological role in the early stages of succession following disturbances. Specifically, it stabilizes soil, enriches habitats with organic matter as the plants decompose, and provides shelter and food for various wildlife species.

The presence of this community in Kosovo was reported by Rexhepi [13], but the report lacked relevés, leaving its exact phytosociological composition undocumented. Therefore, the aim of this paper is to provide a detailed compositional overview of this plant community based on original relevés conducted on Mt. Luboten (Sharri Mts.) in Kosovo.

MATERIAL AND METHODS

Study site

The study area covers the montane zone near the forests of Mt. Luboten, a prominent mountain massif in the Sharri Mountains, located in the border region between Kosovo and North Macedonia (Figure 1). This area lies between 42°11'-42°13'N and 21°07'-21°09'E, with relevés recorded at altitudes ranging from 1,310 m to 1,730 m a.s.l. Annual precipitation ranges from 900 to 1,100 mm, occurring mainly during the autumn-spring period, peaking in November and reaching a minimum in August [15]. The average annual temperature is 7.6 °C, with August being the warmest month. Mt. Luboten is part of the Scardo-Pindian mountain system and forms the northeasternmost massif of the Sharri Mountains [16]. The mountain reaches an elevation of 2,498 m a.s.l. and features a distinctive pyramid shape above the Kaçanik Gorge and the Tetovo Valley.

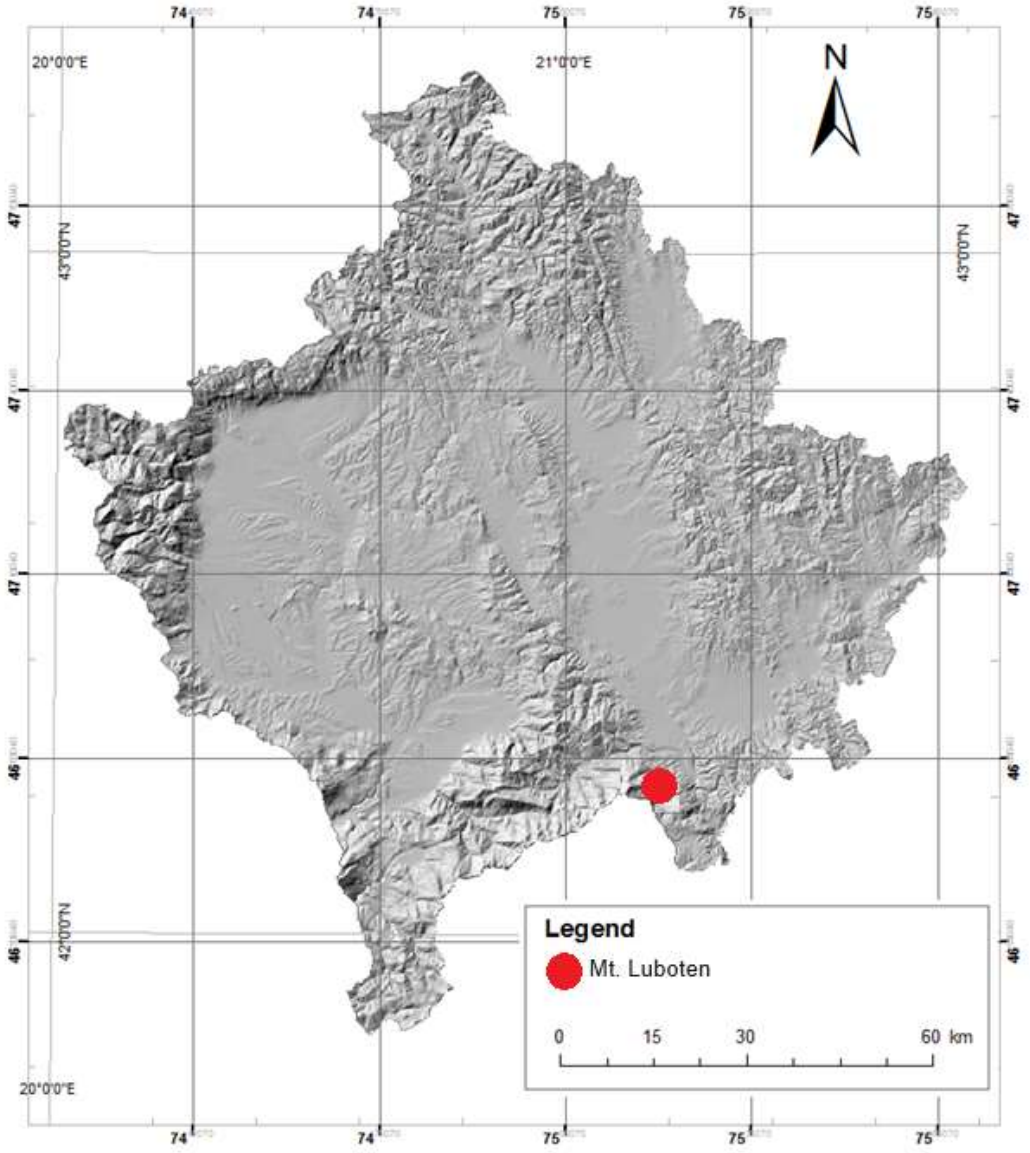

Figure 1. The location of the study area in Mt. Luboten in Kosovo

Data set and classification approach

To clarify the syntaxonomic position of this plant community, which is based on 18 original relevés, we developed a working database in JUICE [17]. This database was supplemented with 9 additional relevés from another plant community, referred to as the *Telekietum speciosae* agg. group from Austria [18], which has not been standardized as an association. This was the only phytosociological community with a standard table of relevés available to us. Unfortunately, we were unable to locate Tregubov's original paper [19] or his original phytosociological table(s). However, we obtained floristic and ecological data on this plant association in a brief descriptive form from Rexhepi [13], despite the absence of the original phytosociological table of the association's relevés. Additionally, we accessed comparative data from a synoptic table that compares various plant communities, including *Telekietum speciosae*, from Neblea [20]. These data enabled us to make direct and more traditional comparisons between our relevés and those representing *Telekietum speciosae*.

Plant species nomenclature follows the Euro-Med Checklist [21]. Fieldwork for relevé sampling was conducted in 2018 and 2020. All vascular plants were recorded using the standard nine-grade Braun-Blanquet scale [22] for cover and abundance estimation (r = few individuals covering <1% of the area; + = more individuals covering <1%; 1 = covers up to 10%; 2 = covers 10-25%; 3 = covers 25-50%; 4 = covers 50–75%; 5 = covers 75–100%).

RESULTS AND DISCUSSION

Regarding the distribution of plant communities dominated by *Telekia speciosa* (Schreb.) Baumg. (Figure 2) in Southeastern Europe, Lafrachnis and Sfikas [23] report that these communities thrive at forest edges in Northern Greece at altitudes between 1,000 and 1,700 m a.s.l. For the regions of the former Yugoslavia, Albania, and Bulgaria, Polunin [24] notes that this species and its associated communities develop exclusively at forest edges. Horvat et al. [25] further report that the Balkan community *Telekietum speciosae* develops not only in sub-montane to montane beech forests but also in clearings of Maple-Ash forests (*Acereto-Fraxinetum* group). They cite Tregubov [19], who indicates that this community also grows in Green Alder bushes (*Salici-Alnetum viridis*).

While discussing the composition and general characteristics of this plant community, Horvat et al. [25] originally state: "In more humid locations, e.g., near watercourses, in small karst sites, and in places where snow remains for long periods of time, a splendid tall herb community develops in forest clearings, dominated by the yellow daisy *Telekia speciosa*. According to Tregubov [19] and Horvat [26], it independently forms a plant community known as *Telekietum speciosae* Tregubov 1941. Like its eponymous species, it occurs only on the Balkan Peninsula and in the Carpathian Mountains, in areas with beech and beech-fir forests. Horvat [26] mentions the following locally characteristic species of this *Telekia*-dominated plant community: *Telekia speciosa*, *Chaerophyllum* sp., and *Urtica dioica*."

Additionally, Rexhepi [13] mentions the *Telekietum speciosae* Tregubov 1941 association for Mt. Luboten, though he does not provide a phytosociological table or relevé. He explains that this plant community develops exclusively in forest clearings and at the edges of subalpine beech forests on the massif. As characteristic species of this plant association, Rexhepi [13] mentions *Telekia speciosa* (Schreb.) Baumg., *Tanacetum macrophyllum* (Waldst. & Kit.) Sch. Bip., *Chaerophyllum aureum* L., *Eupatorium cannabinum* L., *Dryopteris filix-mas* (L.) Schott, and *Galium mollugo* L., among others.

Figure 2. *Telekia speciosa* (Schreb.) Baumg. observed in a forest clearing at the edge of a beech forest, at 1480 m a.s.l., on Mt. Luboten (01.07.2018, Berisha, N.).

The hierarchical classification of the *Telekion speciosae* group, derived from JUICE analysis (Figure 3), revealed significant differentiation between our set of 18 relevés from Mt. Luboten (Cluster 1) and the comparable set of 9 relevés (Cluster 2) from the *Telekietum speciosae* agg. group in Austria [18]. This differentiation is likely due to the considerable geographical distance between our study area in the Sharri Mountains (Southeastern Europe) and the study area of Brandes [18] in the Austrian Alps (Central Europe). Additionally, there was high variability in the general floristic composition and ecological conditions under which these two phytocoenoses developed.

In terms of the syntaxonomic affiliation of this association, the diagnostic taxa for the Class, Order, and Alliance were well represented in the phytosociological relevés from Mt. Luboten, generally with high constancy values (Table 1). The characteristic and differential species of the association were: *Telekia speciosa* (Schreb.) Baumg., *Mentha longifolia* (L.) L., *Sambucus ebulus* L., *Tanacetum parthenium* (L.) Sch. Bip., and *Arctium lappa* L.

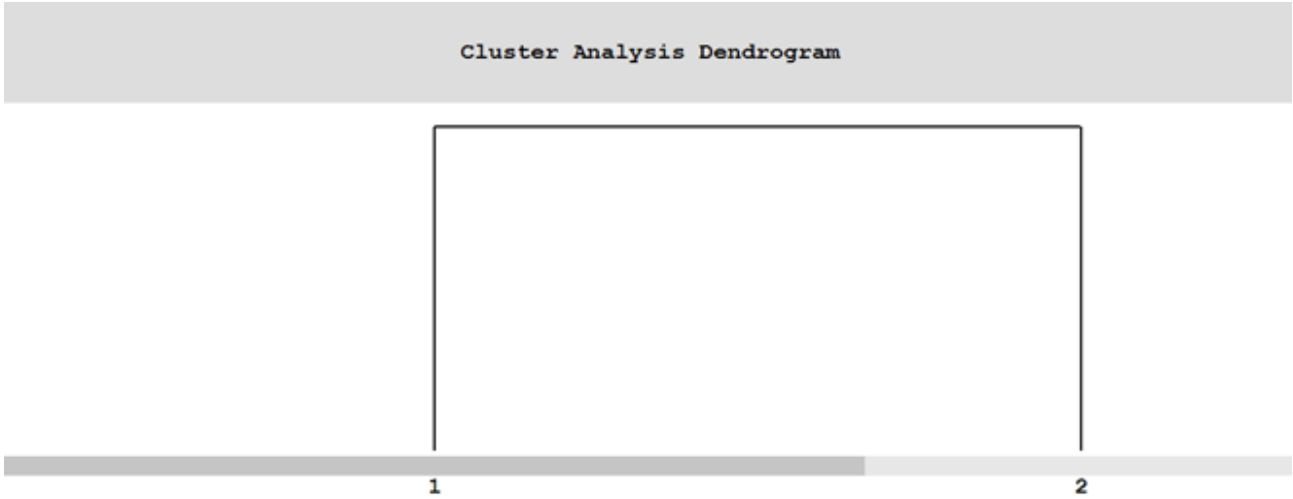

Figure 3. The hierarchial classification of the *Telekion speciosae* group – between our set of our 18 relevés from Mt. Luboten (Cluster 1) and the comparable set of 9 relevés from the *Telekietum speciosae* agg. group from Austria (Cluster 2).

Table 1. Analytical table of the Association: ***Telekietum speciosae* Tregubov 1941**

Relevé no.	1	2	3	4	5	6	7	8	**9***	10	11	12	13	14	15	16	17	18	**Constancy level**
Original relevé no.	40	42	45	43	44	46	41	47	52	49	53	51	55	48	50	54	56	57	
Cover in tot. (%)	98	95	90	98	95	85	98	90	95	90	90	90	95	95	90	90	95	95	
Characteristic and different. species																			
Telekia speciosa	4	4	4	4	3	2	3	4	4	4	3	4	3	5	4	4	4	4	**V**
Mentha longifolia	2	2	2	1	1	3	2	2	2	1	1	1	2	1	2	2	2	2	**V**
Sambucus ebulus	1	2	1	1	3	3	2	1	1	1	1	2	2	1	2	3	1	1	**V**
Tanacetum parthenium	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	**V**
Arctium lappa	+	+	+	1	1	1	2	2	1	+	1	1	2	+	+	+	+	+	**V**
CL = *Epilobietea angustifolii*																			
OR = *Galeopsio-Senecionetalia sylvatici*																			
Eupatorium cannabinum	2	1	2	2	2	2	3	2	2	3	3	3	3	1	1	1	1	2	**V**
Chaerophyllum hirsutum	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	**V**
Fragaria vesca	.	+	+	+	+	.	+	+	+	+	+	+	+	+	+	+	+	.	**V**
Geranium robertianum	+	+	+	+	+	+	+	+	+	+	+	+	+	+	.	+	+	.	**V**
Aegopodium podagraria	+	+	.	+	+	+	+	+	+	+	+	+	.	+	+	+	+	.	**V**
Galium aparine	+	1	+	+	.	+	+	+	+	+	+	.	+	+	+	.	.	+	**IV**
Sambucus racemosa	+	+	+	.	+	.	2	+	+	.	2	.	+	+	+	+	.	+	**IV**

Table 1. Continues

Salix caprea	+	.	.	.	+	+	+	+	+	+	.	.	.	.	.	+	.	+	**III**
Geum urbanum	+	.	.	+	+	.	.	.	.	+	+	.	+	.	.	.	+	+	**III**
ALL = *Epilobion angustifolii*																			
Atropa bella-donna	+	+	+	+	+	+	1	1	1	+	+	+	1	1	+	+	1	+	**V**
Lactuca muralis	+	.	+	+	+	+	+	+	+	+	+	.	+	+	+	+	.	+	**V**
Urtica dioica	+	+	+	+	+	1	.	+	+	+	+	+	+	+	.	+	+	+	**V**
Lapsana communis	.	+	+	+	.	.	+	+	.	+	+	+	+	+	+	+	+	+	**IV**
Accompanying species																			
Pteridium aquilinum	+	1	+	+	+	1	+	+	+	+	+	+	+	+	1	+	+	+	**V**
Prunella vulgaris	1	1	1	1	+	+	1	+	+	+	+	+	1	+	1	1	+	1	**V**
Clinopodium grandiflorum	+	1	+	+	1	+	+	+	+	+	+	+	+	+	+	+	+	+	**V**
Fagus sylvatica	+	+	+	+	+	+	+	1	+	+	1	+	+	+	+	+	+	.	**V**
Achillea grandifolia	+	+	+	+	+	1	+	+	+	+	+	+	.	+	+	+	+	+	**V**
Carex sylvatica	+	+	+	+	.	+	1	+	+	+	+	+	+	+	+	+	+	+	**V**
Epilobium montanum	+	+	+	+	+	+	+	.	.	+	+	+	+	+	+	+	+	+	**V**
Lotus corniculatus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	.	.	**V**
Trifolium campestre	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	.	.	**V**
Juncus effusus	+	1	.	1	+	+	+	+	+	+	+	+	+	+	+	+	.	+	**V**
Galium odoratum	+	+	+	.	+	+	+	+	+	+	+	+	+	+	+	.	+	+	**V**
Hieracium murorum	+	1	+	+	+	+	+	+	+	+	+	+	.	+	+	+	+	.	**V**
Artemisia vulgaris	+	+	+	+	+	+	.	+	+	.	+	+	+	+	+	+	+	+	**V**
Calamagrostis arundinacea	+	+	+	+	+	+	+	.	+	+	+	+	+	+	.	.	+	+	**V**
Salvia verticillata	+	+	.	+	+	+	+	+	+	+	+	+	.	+	+	+	.	+	**V**
Agrostis canina	.	+	+	+	+	+	+	.	+	+	+	.	+	+	+	+	+	+	**V**
Carex echinata	+	+	+	+	+	.	+	+	+	+	+	+	+	+	+	.	+	.	**V**
Trifolium repens	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	.	+	+	**V**
Campanula trachelium	+	+	+	+	+	+	.	.	+	+	+	+	+	+	+	.	+	+	**V**
Trifolium pratense	+	+	+	1	+	.	+	+	+	+	+	+	+	+	+	.	+	+	**V**
Hypericum montanum	.	.	+	+	+	+	.	+	+	+	.	+	+	+	+	+	+	+	**IV**
Verbena officinalis	+	+	+	+	+	+	.	.	+	.	+	+	+	+	+	+	.	+	**IV**
Lysimachia punctata	+	+	+	+	+	+	.	+	+	+	+	+	.	+	.	+	+	.	**IV**
Hypericum perforatum	+	+	.	+	+	+	1	+	.	+	+	+	+	.	+	+	+	.	**IV**
Rosa micrantha	+	.	+	+	+	+	+	.	+	+	+	.	.	+	+	+	+	+	**IV**
Cardamine flexuosa	+	+	+	.	+	+	.	+	.	.	+	+	+	+	+	+	+	+	**IV**
Acer platanoides	+	+	+	1	1	+	+	+	+	.	+	+	+	.	.	.	+	+	**IV**
Agrostis stolonifera	+	+	+	+	.	+	1	+	+	.	.	+	.	+	+	+	.	+	**IV**
Erigeron alpinus	+	+	+	.	.	+	+	+	+	.	+	+	+	+	.	+	+	.	**IV**
Circaea lutetiana	+	+	+	+	+	+	+	.	+	+	+	.	.	.	.	+	+	+	**IV**
Plantago lanceolata	+	+	.	+	+	+	+	+	+	+	.	.	+	+	+	+	.	.	**IV**
Serratula tinctoria	.	+	+	+	+	+	.	.	.	+	+	+	.	+	+	+	+	+	**IV**
Euphorbia amygdaloides	+	+	+	+	+	+	1	.	+	+	.	.	+	.	+	+	.	.	**IV**
Anthoxanthum odoratum	.	+	.	+	+	+	+	+	+	+	.	+	+	+	.	.	.	+	**IV**
Bromus racemosus	+	+	+	+	+	+	.	+	.	.	.	+	+	.	.	+	+	+	**IV**
Cirsium arvense	.	.	+	.	+	+	.	+	.	+	.	+	+	+	+	+	+	+	**IV**
Veronica chamaedrys	+	+	+	.	+	.	+	+	+	+	+	+	.	.	+	+	+	+	**IV**
Lonicera alpigena	.	.	+	+	.	+	.	.	+	.	+	+	+	.	+	+	+	+	**IV**
Plantago major	+	.	+	.	+	.	+	+	.	+	+	+	+	.	+	+	+	+	**IV**
Dryopteris filix-mas	.	.	+	.	.	+	.	+	.	.	+	.	+	+	+	+	+	+	**III**
Omphalodes verna	.	.	+	+	+	+	.	+	+	+	+	+	.	.	.	+	.	.	**III**
Rumex crispus	.	+	.	.	+	+	+	+	+	.	.	+	+	.	.	+	.	.	**III**
Galium mollugo	.	.	+	.	.	.	.	+	+	+	+	+	+	+	+	.	.	.	**III**
Sambucus nigra	+	+	.	+	.	+	+	.	.	.	.	.	.	+	+	+	.	.	**III**
Anemone nemorosa	.	.	.	.	.	.	.	.	+	.	+	+	+	+	+	.	+	+	**III**
Primula acaulis	.	.	.	.	.	.	.	.	+	+	+	+	+	.	+	+	+	.	**III**
Trifolium medium	.	.	.	.	.	+	.	.	+	+	+	+	+	.	+	.	+	.	**III**
Acer campestre	.	.	.	.	.	.	.	+	+	.	+	+	+	+	+	+	.	.	**III**

Table 1. Continues

Populus tremula	+	+	+	.	.	+	+	.	.	.	+	.	.	+	+	.	.	.	**III**
Erythronium dens-canis	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	+	.	**II**
Lamium galeobdolon	.	.	.	.	.	.	.	.	+	.	+	+	+	.	.	+	.	+	**II**
Teucrium chamaedrys	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	+	+	+	**II**
Tilia tomentosa	.	.	.	.	.	.	.	.	.	+	+	.	.	.	+	.	+	.	**II**
Pulmonaria officinalis	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	+	**II**
Hedera helix	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	+	+	**II**
Betula pendula	+	.	+	+	+	.	+	+	.	.	.	.	.	.	+	.	.	.	**II**
Abies alba	.	.	.	.	.	.	.	.	+	+	+	+	.	.	+	+	.	+	**II**
Campanula persicifolia	.	.	.	.	.	.	.	.	+	.	.	+	+	.	+	+	+	+	**II**
Equisetum palustre	.	.	.	.	.	+	.	+	+	+	.	.	.	+	+	.	+	.	**II**
Tanacetum vulgare	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	+	+	.	**II**
Scrophularia nodosa	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	**I**
Oxalis acetosella	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	**I**

The plant taxa that compose this community include various life forms (Figure 4), with Hemicryptophytes being the most dominant (54 %), followed by Phanerophytes (15 %), Geophytes (14 %), Chamaephytes (9 %), Therophytes (7 %), and Neophytes (1 %). This dominance is largely due to the community's physiognomy, which is characterized by a prevalence of grassy perennials, alongside a notable presence of shrubs and annual plants. The predominance of Hemicryptophytes suggests that the environment on Mt. Luboten, where this association is found, undergoes significant seasonal changes, such as cold winters. Hemicryptophytes have an advantage in such climates as they can survive harsh conditions by maintaining their growing points close to the ground, where they are insulated by snow or accumulated plant litter.

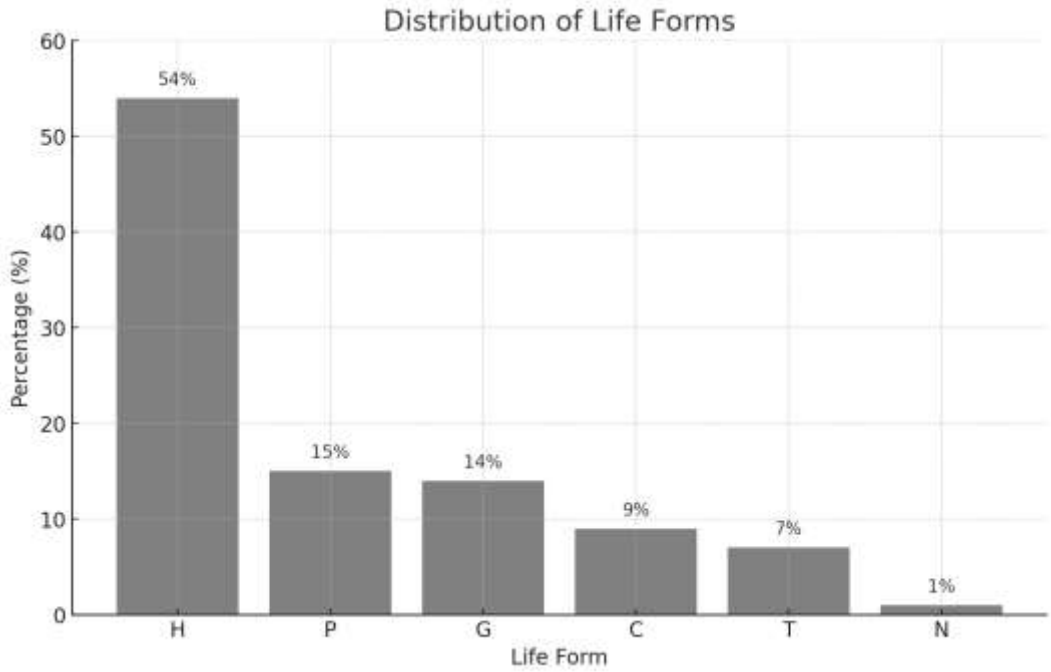

Figure 4. Life form spectrum of the *Telekietum speciosae* Tregubov 1941 association from our relevés on Mt. Luboten

The chorological spectrum of the plant community from Mt. Luboten (Figure 5) reveals a predominance of Euro-Asiatic species, comprising the largest share of taxa (17 species). This indicates that the community has a substantial representation of species with broad distributions across Europe and Asia, suggesting adaptability to a wide range of climatic and environmental conditions.

Following this, Europe-Caucasian (11 species) and Circumboreal (10 species) elements also have significant representation. The presence of Circumboreal species highlights the influence of boreal or cold-temperate climates, which aligns with the high-altitude environment of Mt. Luboten.

Other noteworthy contributors include Paleotemperate (9 species) and Eurosiberian (8 species) taxa, which indicate species with distributions extending into Siberia and central to eastern Europe. The presence of these taxa suggests that the community may have evolved under historical climatic conditions, enabling the migration and establishment of these species in the area.

The relatively lower representation of taxa such as Eurimediterranean (5 species), Subcosmopolitan (4 species), and Balkan (1 species) elements underscores the unique biogeographic position of Mt. Luboten. The limited presence of Balkan endemic species (only 1 species) indicates that while the community includes some regional endemics, it is more influenced by broader continental and global distribution patterns than by localized endemism.

This chorological spectrum reflects the biogeographical history and environmental conditions of Mt. Luboten. The dominance of Euro-Asiatic and Circumboreal elements suggests a community adapted to temperate to cold climates, potentially shaped by glacial and post-glacial migration patterns.

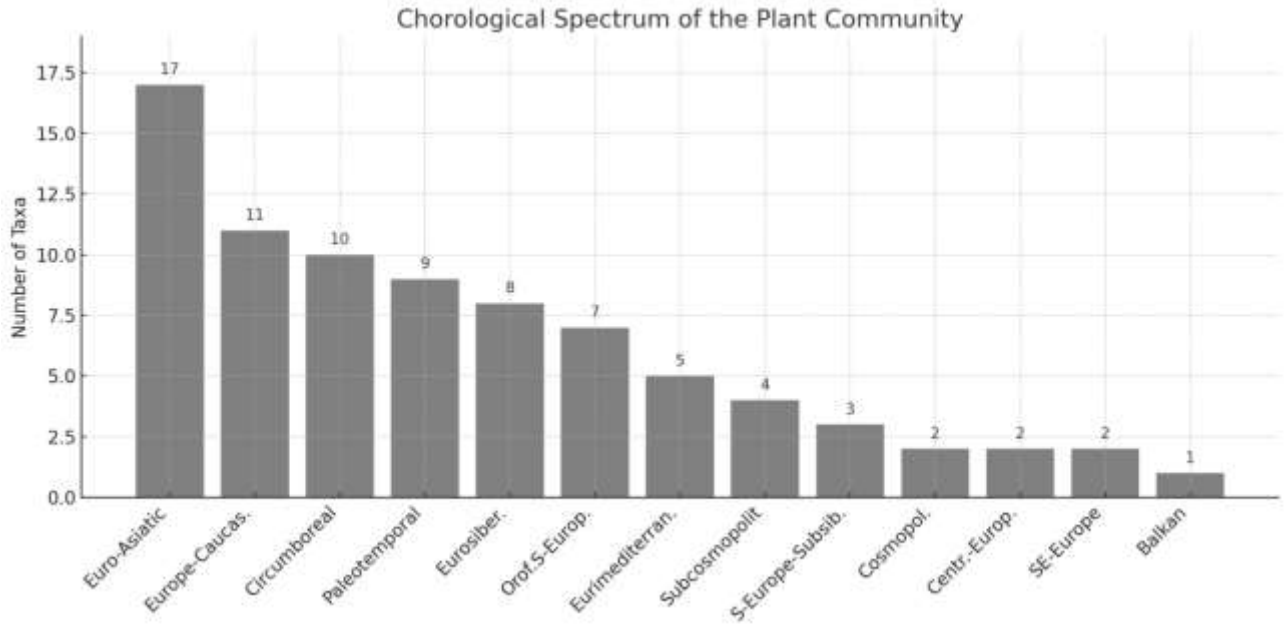

Figure 5. The chorological spectrum of the described Association: *Telekietum speciosae* Tregubov 1941 from our relevés on the Mt. Luboten

This plant community (Figure 6) boasts a rich floristic composition, comprising 80 plant taxa, and serves as a vital ecological component of the beech forest habitat on the Luboten massif. In addition to hosting significant plant taxa, such as *Atropa bella-donna* L., it represents a successional community in the process of transitioning from a heavily degraded forest habitat back to its original natural state.

It is essential to emphasize the critical need for extensive comparative studies of these pioneer plant communities across various regions. Establishing a comprehensive database with a large collection of relevés would be invaluable. Such a database would facilitate the comparison of relevés from the Sharri Mountains and other Balkan massifs [27] with those from the Western European Alps, the Caucasus [28], and the Carpathian regions [29]. This comparative approach would enable more accurate interpretations and provide clearer insights into the composition, structure, and ecological dynamics of these fascinating and complex plant communities. A broader understanding could significantly contribute to the conservation and management of pioneer vegetation across the Balkans and beyond, underscoring its ecological importance in the recovery and succession of forest habitats.

The *Telekietum speciosae* community on Mt. Luboten, Kosovo, shares several similarities

with the *Telekio-Petasitetum hybridi* community from Bulgaria and Romania [30, 31], particularly in their habitat preferences for humid, nitrogen-rich environments and the presence of tall herbaceous plants. Both communities contribute to early ecological succession, stabilizing soils and supporting forest recovery. However, key differences arise in species dominance: *Telekia speciosa* is more prominent in the Mt. Luboten community, while *Petasites hybridus* dominates in the Bulgarian-Romanian community. Additionally, species richness is significantly higher in the Mt. Luboten community, with 80 taxa compared to an average of 21 in the *Telekio-Petasitetum hybridi* community. These distinctions likely reflect variations in altitude and geographical isolation, as the Mt. Luboten community occupies a higher range (up to 1730 m) and plays a stronger role in forest succession following disturbances.

Figure 6. View of the plant association *Telekietum speciosae* Tregubov 1941 from Mt. Luboten, located on the edges of beech forests at 1550 m a.s.l. (Berisha, N. – 08.07.2018)

The findings of this study highlight the need for further research and comparative studies of pioneer plant communities, particularly those dominated by *Telekia speciosa*, across various European regions. Establishing a comprehensive database containing relevés from the Sharri Mountains, other Balkan massifs, the Western European Alps, the Caucasus, and the Carpathians would be an invaluable resource for the scientific community. Such a database would enable a deeper understanding of the biogeographical, ecological, and successional dynamics of these communities.

Comparative studies would allow researchers to discern regional variations and commonalities within the *Telekietum speciosae* group, offering clearer insights into how different environmental conditions and historical factors have shaped these plant communities. For instance, the differentiation observed between the *Telekietum speciosae* communities in the Austrian Alps and those in the Sharri Mountains suggests the influence of geo-

graphical isolation and varying ecological conditions. By broadening the scope of such studies to include other regions, researchers can gain a more holistic understanding of the evolutionary processes governing plant community development in forest ecosystems.

Furthermore, the implications of this research extend beyond academic interest. Understanding the successional dynamics of pioneer plant communities is critical for the conservation and restoration of forest habitats. As these communities often serve as early indicators of environmental change and forest recovery, they can inform conservation strategies aimed at preserving biodiversity and maintaining ecosystem resilience in the face of climate change and human disturbances.

Future research should focus on expanding the geographical scope of relevé collections to include underrepresented regions, such as the Caucasus and Carpathians, and integrating this data into a shared database accessible to the scientific community. Additionally, there is a need to explore the functional traits of the dominant species within these communities, particularly how they contribute to ecosystem processes like nutrient cycling, soil stabilization, and habitat provision for wildlife.

In conclusion, the *Telekietum speciosae* Tregubov 1941 association represents not only a vital component of the forest ecosystems on Mt. Luboten but also a key to understanding broader ecological patterns and processes at play across European mountain regions. The continuation of such research will undoubtedly contribute to more effective conservation and management of these unique and ecologically significant plant communities.

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ДОПОЛНУВАЊА КОН ФИТОЦЕНОЛОШКИОТ СОСТАВ НА EPILOBION ANGUSTIFOLII OBERD. 1957 ОД ШАР ПЛАНИНА – ЉУБОТЕН

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Оваа студија дава детална фитосоциолошка анализа на асоцијацијата *Telekietum speciosae* Tregubov 1941, пионерска растителна заедница пронајдена на косовскиот дел од Шар Планина – Љуботен. Составот, синтаксономијата и хорологијата на заедниците е истражуван преку 18 оригинални вегетациски снимки, споредени со постоечките податоци од Австрија. Со анализата, авторите констатираат значајна диференцијација во флористичкиот состав и еколошките услови помеѓу вегетациските снимки од планината Љуботен и тие кои потекнуваат од австриските Алпи, нагласувајќи го влијанието на географската изолација и локалните фактори на животната средина. Во составот ass. *Telekietum speciosae* од планината Љуботен претежно доминираат хемикриптофити, што укажува на нејзината адаптација на умерено ладна клима со значителни сезонски промени. Во хоролошкиот спектар доминираат евроазиски и циркумбореални видови, кои ја одразуваат биогеографската историја и условите на животната средина во регионот. Оваа студија го нагласува еколошкото значење на *Telekietum speciosae* во шумската сукцесија и ја нагласува потребата од

сеопфатна база на податоци со која би можеле да се олеснат компаративните студии низ Европа. Ваквите истражувања се од витално значење за разбирање на еволутивните процеси кои ги обликуваат пионерските растителни заедници, како и за стратегиите кои се насочени за зачувување на биолошката разновидност во планинските екосистеми.

Клучни зборови: синантропска вегетација; нитрофилна рабна вегетација; *Telekietum speciosae*; Косово; еколошка сукцесија; пионерски растителни заедници