CONTRIBUTIONS TO THE KNOWLEDGE OF THE ASSOCIATION STELLARIO NEMORI-ALNETUM GLUTINOSAE (KÄSTNER 1938) LOHMEYER 1957 FROM THE NORTHERN PART OF THE SEMENIC MOUNTAINS

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RESEARCH ARTICLE

Abstract

This paper presents, for the first time, the phytocenological, ecological, and eco-protective study of the association Stellario nemori-Alnetum glutinosae (Kästner 1938) Lohmeyer 1957, identified in the northern part of the Semenic Mountains in southwestern Romania.

The synthetic table of the Stellario nemori-Alnetum glutinosae (Kästner 1938) Lohmeyer 1957 association includes information regarding the species that compose the floristic composition of the plant populations constituting the association, the life forms, floristic elements, ecological indices, the order number of phytocenological relevés, altitude (m.a.s.l.), tree diameter, tree height, tree consistency, tree exposure, slope inclination (%), area (m²), and coverage degree (%), differentiated by vegetation tiers.

The research was conducted to provide special attention to the analysis of life forms, floristic elements, ecological indices, and karyotype through their graphic interpretation in the form of histograms and diagrams.

Keywords: association; relevés; life forms; floristic elements; ecological indicators; karyotype.
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INTRODUCTION

The Semenic Mountains are situated in the southwest, within the territory of Caraș-Severin County, which covers an area of 8514 square kilometers. A geographic area of 980 square kilometers (Figure 1) was investigated, including the territories of the production units located within the Reșița and Văliug Forestry Divisions. Geologically, these mountains consist of crystalline metamorphic rocks. In the basins of the Secu and Râul Alb valleys, the mountain foundation is composed of crystalline schists, over which Paleozoic and Mesozoic sedimentary deposits are arranged. Depressions and along the main valleys are predominantly characterized by sedimentary formations, including marls, clays, and alluvium (gravel and sand).

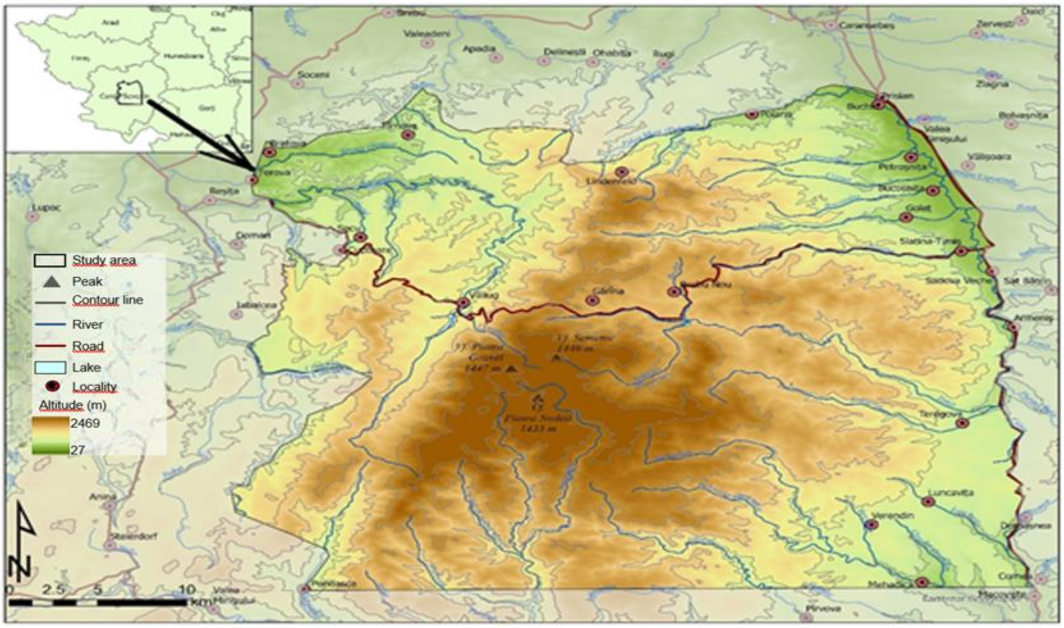

Figure 1 **Geographic Location and Delimitation of the Northern Part of Semenic Mountains (taken from Stereo 70 cartographic projection)**

The most frequently encountered altitude within the studied forested areas ranges between 350 to 970 meters. The aspect is largely determined by the direction of flow of the main rivers (Râul Bârzava, Secu, Râul Alb, Timiș, Stârnic, Groposu, Pietrosu, Bârzăvița).

The majority of the studied area falls within the temperate continental climate zone with Mediterranean influences. The thermal regime is fairly consistent, and monthly precipitation throughout the year does not drop below 300 mm. The average annual temperature for the Semenic Mountains ranges from 8°C to 4°C, indicating a relatively balanced thermal equilibrium and a pronounced moisture regime in the climate. The highest average monthly temperature occurs in July at 16°C, the lowest in January at -6°C, and the average temperature during the vegetation season is around 7-8°C.

Precipitation in the Semenic Mountains is abundant, with uneven distribution throughout the year, reaching a minimum in January and February and a maximum during the months of May and June. Among the atmospheric precipitations, snowfall plays an important role, contributing to a substantial snow cover with a prolonged presence during the colder months of the year. The first day of snowfall usually occurs in early November, and the last day in late April.

The most significant winds predominantly come from the south, southwest, and west directions (Austrul and Foehn), as well as from the southeast sector (Coșava).

MATERIALS AND METHODS

In the vegetation research, we employed the phytosociological research methods developed by Braun-Blanquet (1964). Sampling technique and quantitative assessments were carried out following the guidelines provided by Borza and Boșcaiu (1965).

To comprehensively identify the phytocoenoses of the association, a total of 10 phytosociological relevés were conducted, which were included in the synthetic table of the association (Table 1). For conducting the sampling relevés, we selected areas of 400 square meters, as homogenous as possible in terms of floristic composition and pedoclimatic conditions, avoiding ecotonal zones.

The phytosociological records contain information about the site conditions where the phytocoenoses evolve, including rock type, soil, altitude, exposure, slope, and vegetation cover. During the compilation of records defining each relevé, we also provided a quantitative assessment of the participation of each species in terms of abundance and dominance, using the method proposed by Braun-Blanquet and Pavillard (1928). Additionally, we completed the overall vegetation cover information using methods developed by Tüxen (1955) and Ellenberg (1974).

The phytosociological table of the association was structured according to the methodology developed by Braun-Blanquet (1964) and improved by Ellenberg (1974). In order to classify the association within higher cenotaxonomic units such as suballiance, alliance, order, and class, we considered both traditional ecological-floristic systems developed by Tüxen (1955), Braun-Blanquet (1964), Borza et Boșcaiu (1965), Soó (1980), as well as more recent works by researchers such as Mucina et al. (1993), Pott (1995), Borhidi (1996), Weber et al. (2000), Sanda (2002), Sanda et al. (2008).

The constancy degree of species (K), whose classes are marked with Roman numerals from I to V, reflects the extent to which each species is faithful to the phytocenotic environment of the association. The values of the synthetic phytosociological index, constancy (K), were calculated using the methods proposed by Braun-Blanquet et Pavillard (1928), Cristea et al. (2004).

The taxonomic nomenclature was carried out according to Ciocârlan (2009), and the plant association was analyzed using the main ecological indices of the component species, life forms, and floristic elements, presenting the data graphically in the form of spectra and diagrams.

RESULTS AND DISCUSSION

Stellaria nemorum meadows were identified along mountain valleys, forming strips approximately 5-10 meters wide. These meadows were found along the Bârzava River floodplain, the Semenic River valley, the Râul Alb River valley, the Bârzava River floodplain near Casa Mihăilescu, the Râul Alb River valley near Lake Secu, in the Bârzava River channel near the Groposu forest lodge, in the Grădiștea stream channel, and on a small stream of the Bârzava River.

This association is widely distributed in the country and has been reported from various regions, including Banat (Coste, 1975; Arvat, 1977), Maramureș (Rațiu, Gergely, 1979), Oltenia (Sanda et al., 1970; Popescu, 1974), Moldova (Chifu, Ștefan, 1973; Chifu et al., 2006), Crișana (Pop et al., 1978; Ardelean, 1999, 2006; Groza, 2008; Laura Loctos-Herman, 2012), Transylvania (Kovács, 1979; Hodișan, Hodișan, 1974; Marian, 1998; Sămărghițan, 2005), as well as from Germany (Pott, 1995), Codru Moma Mountains (Pășcuț, 2012), Orăștie River (Vințan, 2014), and Meseș Mountains (Ștef, 2021).

Habitat type: code R4402 Dacian-Getic alluvial forests with black alder (*Alnus glutinosa*) and *Stellaria nemorum* NATURA 2000: 91E0 Aluvial forest with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*); PAL.HAB: 44.323 Pre-Carpathian stream ash-alder woods; EUNIS: G1.2123 Pre-Carpathian stream ash-alder woods; (Doniță et al., 2005). Habitat with very high conservation value.

The phytocenoses of the association (Figure 2) are situated on low terraces along riverbanks, growing on alluvial, poorly gleyed, often rocky, wet-moist, eutrophic soils, composed of coarse alluvial deposits of gravel and sand in the intramontane valley bottoms, at altitudes ranging from 350 to 970 meters. In the phytocenosis of the association, the tree layer reaches heights between 10-16 meters and diameters of 16-24 centimeters, with a density of 0.5-0.6. The characteristic and dominant species in the tree layer is the black alder (*Alnus glutinosa*), with an abundance-dominance of 65.00% ADm. Other species present include ash (*Fraxinus excelsior*), white alder (*Alnus incana*), white willow (*Salix alba*), beech (*Fagus sylvatica*), hornbeam (*Carpinus betulus*), cherry (*Cerasus avium*), and birch (*Betula pendula*).

Figure 2 ***Stellario nemori-Alnetum glutinosae*** **(Kästner 1938) Lohmeyer 1957 at the tail of Trei Ape Lake**

The shrub layer, with variable development, consists of species such as *Sambucus nigra*, *Crataegus monogyna*, *Corylus avellana*, *Cornus sanguinea*, *Clematis vitalba*, *Evonymus europaeus*, *Rosa canina*, and *Viburnum opulus*. In the herbaceous layer of the association, the characteristic species *Stellaria nemorum* stands out with an abundance-dominance of 6.15% ADm.

The cenotic core of the association (Table 1) is composed of characteristic species of the ***Alnenion glutinosae-incanae*** suballiance, including those with higher constancy: *Circaea lutetiana*, *Impatiens noli-tangere*, *Chrysosplenium alternifolium*, *Carex brizoides*, *Alnus incana*; the ***Alno-Ulmion*** alliance: *Carex sylvatica*, *Stachys sylvatica*, *Festuca gigantea*, *Lysimachia nummularia*, *Salix cinerea*, *Listera ovata*; the ***Fagetalia sylvaticae*** order: *Pulmonaria officinalis*, *Rubus hirtus*, *Asarum europaeum*, *Fagus sylvatica*, *Euphorbia amygdaloides*; and the ***Querco-Fagetea*** class: *Geum urbanum*, *Carpinus betulus*, *Athyrium filix-femina*, *Brachypodium sylvaticum*, *Cerasus avium*.

The floristic inventory of this association, covering 40-85% and with a heterogeneous composition, includes 130 species, among which the more frequent ones are *Circaea lutetiana*, *Impatiens noli-tangere*, *Rubus hirtus*, and *Urtica dioica*. Species from nitrophilous grasslands situated on the margins of mountain streams, subordinated to the ***Galio-Urticetea*** class, infiltrate the association: *Anthriscus sylvestris*, *Urtica dioica*, *Galium aparine*, *Salvia glutinosa*, as well as shrub and subshrub species characteristic of forest edges and clearings falling under the ***Rhamno-Prunetea*** class: *Sambucus nigra*, *Crataegus monogyna*, *Corylus avellana*, ***Vaccinio-Piceetea***: *Oxalis acetosella*, *Picea abies*. Additionally, transgressive, hygrophytic, and mesohygrophytic plants from neighboring meadows and wetlands, falling under the ***Molinio-Arrhenatheretea*** class, are present: *Juncus effusus*, *Ranunculus repens*, *Filipendula ulmaria*; and the ***Phragmitetea australis*** class: *Lycopus europaeus*, *Lysimachia vulgaris*, *Myosotis scorpioides*, *Caltha palustris*.

Alder wood is soft and lightweight, with high water resistance, making it suitable for hydrotechnical constructions such as protective embankments and pilings. It is also used in the production of toys, matchboxes, pencils, and more recently, in the manufacturing of wood chipboards and fiberboard panels. It is a fast-growing species and a biomass accumulator, shortening the development cycle towards maturity.

Due to its small variations between wet and dry states, this wood serves well as a material for carving as well as for creating molds in the casting process. Mycorrhizal associations with the nitrogen-fixing fungus *Actinomyces alni* form in the root nodules, enriching the soil with nitrogen.

The bark of the trunk is used for tanning leather, fur, and dyeing fabrics. The bark of black alder contains tannins to an extent comparable to oak, which is easily extractable and can be used together with cones for obtaining certain colorants.

The well-developed root system stabilizes and strengthens riverbanks, preventing soil erosion. The rapid growth of black alder, coupled with its wood properties and adaptability to challenging terrains, supports the necessity of conserving this species in its natural habitat. Its rapid growth in youth, nitrogen enrichment of soil, and ease of propagation through shoots make black alder a pioneering species, useful for stabilizing and improving sliding terrains, as well as reforesting areas where other species cannot be used

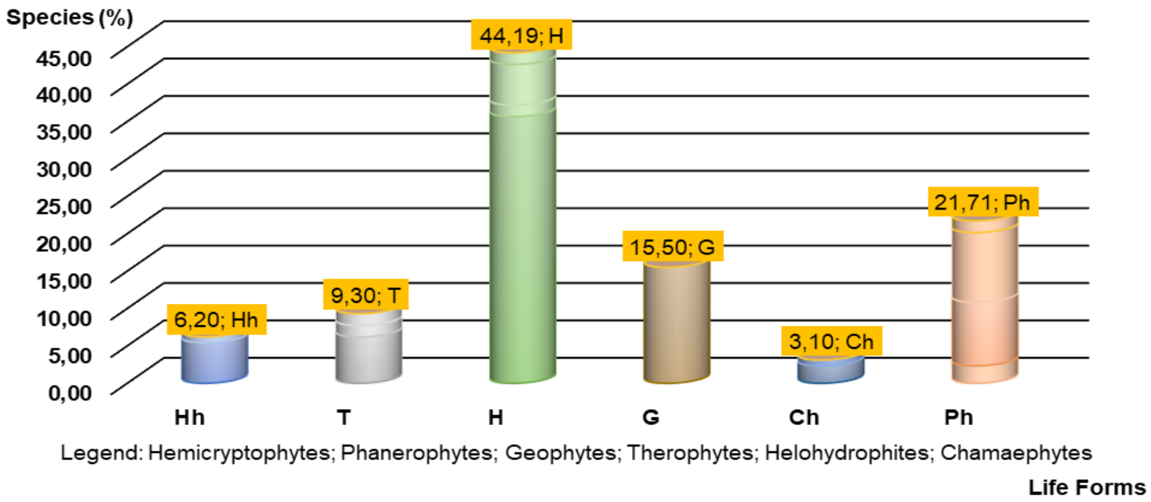

Figure 3 **The spectrum of life forms in the association Stellario memori-Alnetum glutinosae (Kästner,1938, Lohmeyer, 1957)**

In the spectrum of life forms (Figure 3), hemicryptophytes dominate (44.19%), followed by phanerophytes (21.71%, including megaphanerophytes 9.30%, mesophanerophytes 8.53%, nanophanerophytes 2.33%, and lianas 1.55%), geophytes (15.50%), therophytes (9.30%), helohydophytes (6.20%), and chamaephytes (3.10%).

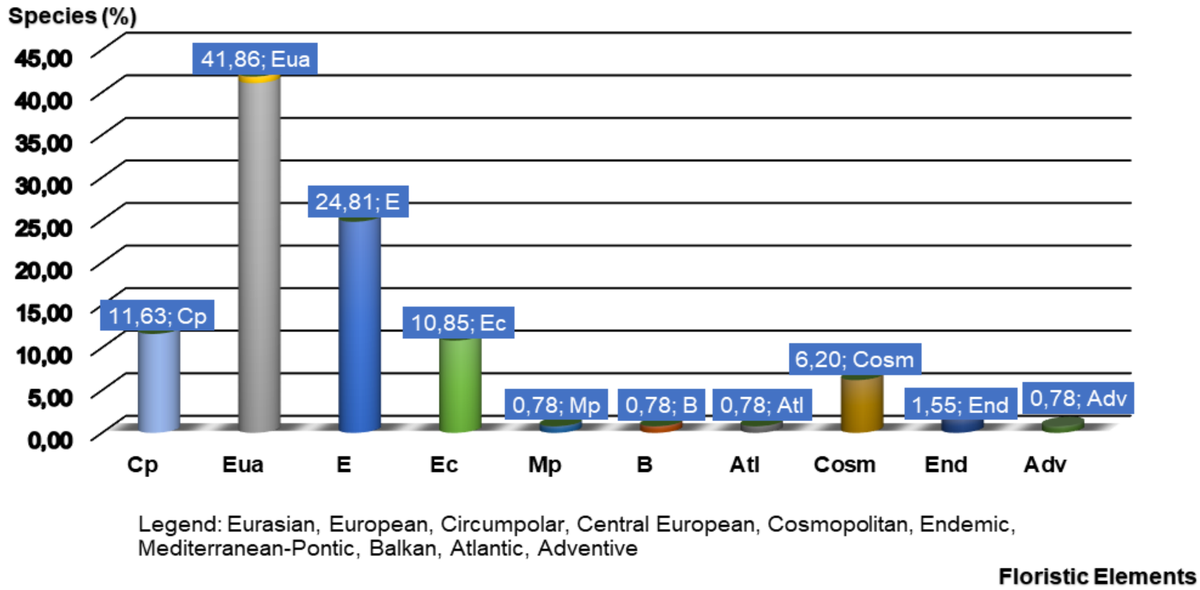

Figure 4 **The spectrum of floristic elements in the association *Stellario nemori-Alnetum glutinosae* (Kästner 1938, Lohmeyer 1957)**

The spectrum of floristic elements (Figure 4) reveals the proportion of Eurasian species (41.86%), followed by European species (24.81%), circumpolar species (11.63%), central European species (10.85%), cosmopolitan species (6.20%), endemic species (1.55%), Mediterranean-Pontic species (0.78%), Balkan species (0.78%), Atlantic species (0.78%), and adventive species (0.78%).

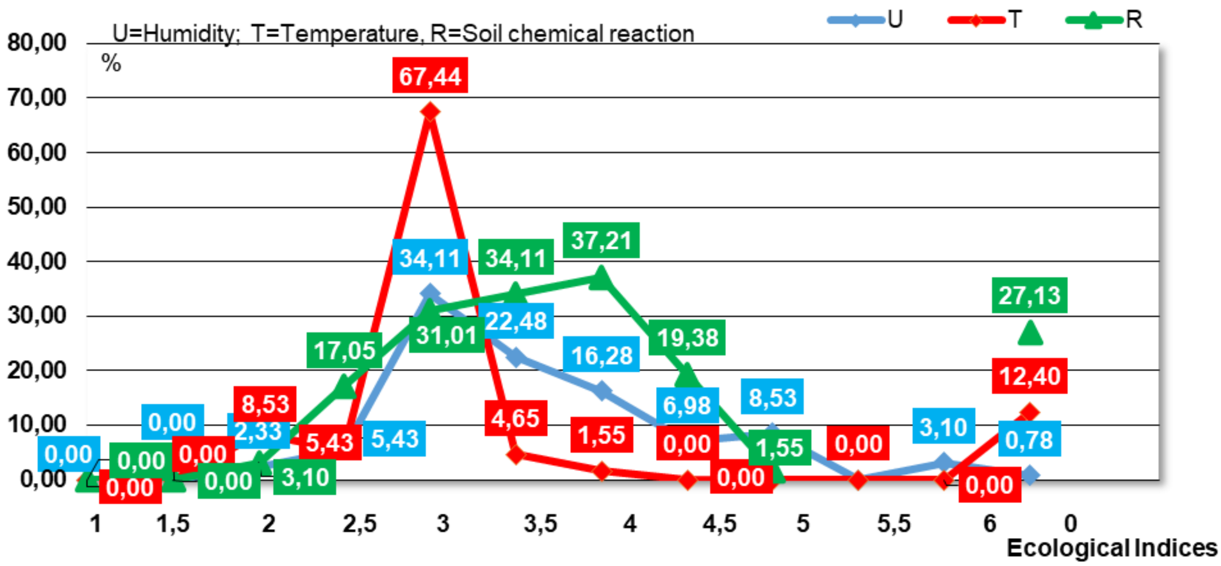

Figure 5 **The ecological indices diagram for the association *Stellario nemori-Alnetum glutinos* (Kästner 1938) Lohmeyer 1957**

Analyzing the ecological index diagram (Figure 5), it illustrates that concerning the moisture factor, mesophilic species predominate (56.59%), followed by meso-hygrophytic species (23.26%), hygrophytic species (8.53%), xero-mesophilic species (7.76%), hydrophytic species (3.10%), and amphibious (eurihydric) species (0.78%). Regarding temperature, there is a dominance of micro-mesothermic species (72.09%), microthermic species (13.96%), amphibious (eurithermic) species (12.40%), and moderately thermophilic species (1.55%). The behavior of species in relation to soil chemical reaction highlights the proportion of weakly acid-neutral species (37.21%), acid-neutral species (31.01%), amphibious (euriionic) species (27.13%), acidophilic species (3.10%), and neutral-basic species (1.55%).

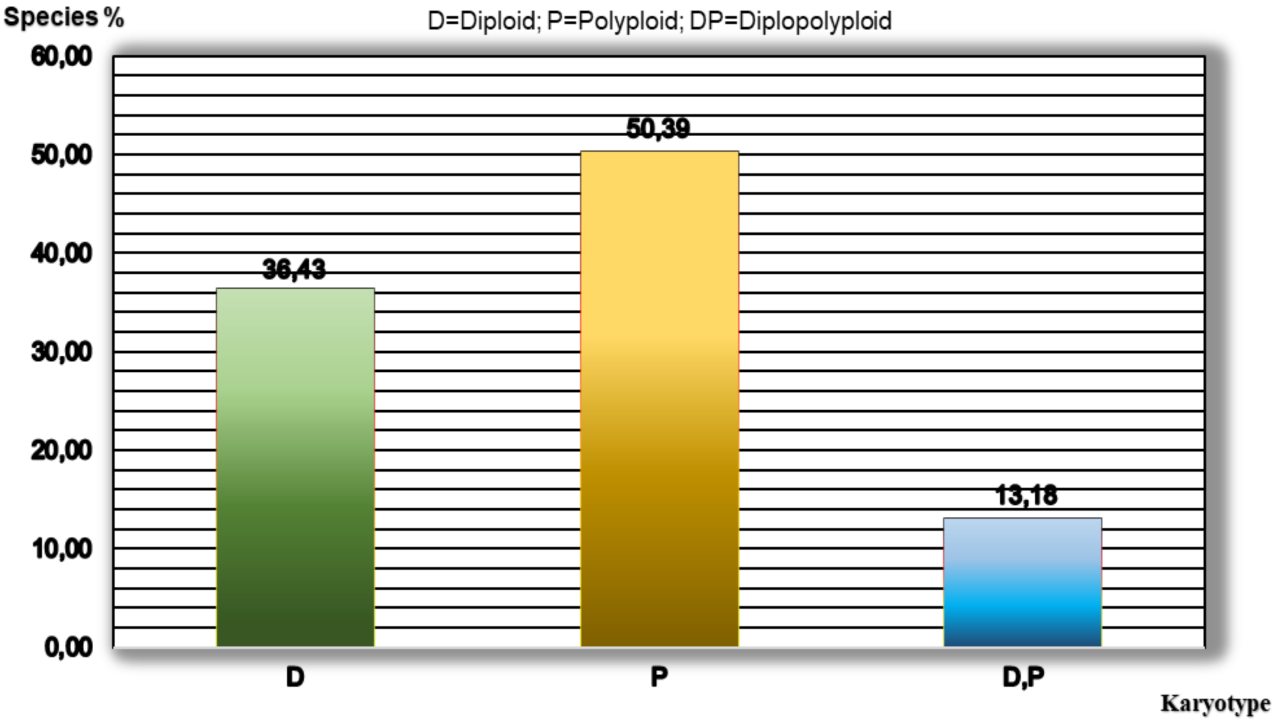

Figure 6 **Cariological spectrum of the association**
***Stellario nemori-Alnetum glutinosae* (Kästner 1938) Lohmeyer 1957**

From a karyological perspective (Figure 6), polyploid species stand out (50.39%), accompanied by diploid species (36.43%), and diplo-polyploid species (13.18%). The diploidy index has a value of 0.72.

Table 1

Stellario nemori-Alnetum glutinosae (Kästner 1938) Lohmeyer 1957

Life Forms	Floristic Elements	U.	T.	R.	2n	Nr. Relevé	1	2	3	4	5	6	7	8	9	10	K	ADm
						Altitude (m)	550	970	510	480	549	380	487	895	870	350		
						Consistency	0,5	0,8	0,5	0,6	0,6	0,7	0,8	0,7	0,8	0,6		
						Tree height (m)	14	16	12	12	16	14	12	10	15	16		
						Tree diameter	22	24	20	18	18	20	18	16	20	22		
						Herbaceous layer coverage (%)	85	60	70	80	65	50	85	70	60	40		
						Area (sqm)	400	400	400	400	400	400	400	400	400	400		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
H	E	3,5	3	3	D	As. *Stellaria nemorum*	1	2	+	2	1	+	1	1	1	+	V	6,15
MPh	Eua	5	3	3	P	As. *Alnus glutinosa*	5	5	3	4	4	3	5	4	5	3	V	65,00
						Alnenion glutinosae-incanae												
G	Eua	3,5	3	4	D	*Circaea lutetiana*	+	+	1	+	+	+	+	+	+	+	V	0,95
Th	Eua	4	3	4	D,P	*Impatiens noli-tangere*	+	+	+	+	-	+	1	+	+	+	V	0,90
MPh	E	4	3	4	P	*Alnus incana*	+	-	+	+	+	-	-	+	+	-	III	0,30
H	Cp-Bo	4	2	4	P	*Chrysosplenium alternifolium*	-	+	-	+	+	-	+	+	-	+	III	0,30
H-G	Ec	3,5	3	2	P	*Carex brizoides*	+	-	-	+	-	+	+	-	+	+	III	0,30
Hh	Cp-Bo	6	3	4	P	*Carex vesicaria*	+	-	+	-	-	-	-	-	1	-	II	0,60
Th	Eua	4,5	3	4	D	*Polygonum hydropiper*	+	-	+	-	+	-	-	-	-	-	II	0,15
H	Ec	4,5	2	0	D	*Chaerophyllum hirsutum*	-	+	-	-	-	-	-	+	-	-	I	0,10
H	Ec	3,5	2	3	P	*Doronicum austriacum*	-	-	-	-	+	-	-	-	+	-	I	0,10
G	Cp	3,5	2	0	P	*Equisetum sylvaticum*	-	-	-	-	-	-	-	+	-	-	I	0,05
H	E	4	3	4	D	*Rumex sanguineus*	-	-	-	-	-	-	-	-	+	-	I	0,05
H	Eua	4,5	3	3	P	*Stellaria palustris*	-	+	-	-	-	-	+	-	-	-	I	0,10
Ch	Eua	4,5	3	4	D	*Solanum dulcamara*	+	-	-	-	-	-	-	-	-	-	I	0,05
						Alno-Ulmion												
H	E	3,5	3	4	P	*Carex sylvatica*	1	+	-	+	-	+	-	+	1	+	IV	1,25
H	Eua	3,5	0	0	P	*Stachys sylvatica*	+	-	+	+	+	-	+	+	+	+	IV	0,40
H	Eua	4	3	2,5	P	*Festuca gigantea*	-	-	-	-	+	-	-	+	-	+	II	0,15
Ch	E	4	3	0	P	*Lysimachia nummularia*	-	+	-	-	-	+	+	-	+	-	II	0,20
G	Eua	3,5	0	4	D	*Listera ovata*	-	+	-	-	-	+	-	+	-	-	II	0,15
mPh	Eua	5	3	3	P	*Salix cinerea*	-	+	-	-	-	-	+	-	-	+	II	0,15
H	Eua	5	0	0	D,P	*Cardamine amara*	-	-	-	-	-	-	+	-	-	+	I	0,10
H	Eua	3,5	3	4	D	*Humulus lupulus*	-	-	+	-	-	-	-	-	-	+	I	0,10
H	E	3,5	0	4	D	*Lamium maculatum*	-	+	-	-	-	-	-	-	-	-	I	0,05
H	Eua	3,5	3	0	P	*Scrophularia nodosa*	-	-	-	-	-	+	-	-	-	-	I	0,05

						Fagetalia sylvaticae												
H	E	3,5	3	3	D	*Pulmonaria officinalis*	+	+	+	+	+	1	+	-	+	+	V	0,90
H-G	Eua	3,5	3	4	D	*Asarum europaeum*	+	+	+	+	3	-	1	-	-	+	IV	4,50
nPh	E	3	2,5	3	P	*Rubus hirtus*	+	-	+	2	+	-	+	+	+	+	IV	2,10
MPh	E	3	3	0	D	*Fagus sylvatica*	+	+	1	-	-	-	+	-	-	+	III	0,70
Ch	E	3	3,5	4	D	*Euphorbia amygdaloides*	-	+	-	+	+	-	-	+	-	+	III	0,25
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
H	Eua	3	2,5	0	D	*Fragaria vesca*	-	+	-	+	-	+	-	-	+	-	II	0,20
H	Ec	3	0	4	D	*Lamium galeobdolon*	-	-	+	-	2	-	-	+	-	+	II	1,90
G	Ec	4	3	3	D	*Leucojum vernum*	-	+	-	-	-	+	-	+	-	-	II	0,15
G	E	3,5	3,5	4	D	*Allium ursinum*	-	-	-	-	-	-	+	-	-	-	I	0,05
G	E	3,5	3	4	P	*Anemone ranunculoides*	-	+	-	-	-	-	-	-	-	-	I	0,05
G	E	3	3	0	D,P	*Corydalis solida*	-	-	-	-	-	+	-	-	-	-	I	0,05
G	Ec	3	3	0	D	*Corydalis cava*	-	-	-	-	-	+	-	-	-	+	I	0,10
G	Eua	3	3	3	P	*Galium odoratum*	-	+	-	-	-	-	-	+	-	-	I	0,10
H	Ec	4	3	3	D,P	*Geranium phaeum*	-	-	-	-	+	+	-	-	-	-	I	0,10
G	Ec	3	3,5	3	D	*Isopyrum thalictroides*	-	-	-	-	-	-	-	+	-	-	I	0,05
H-G	Ec	3	3	3	D,P	*Symphytum tuberosum*	-	-	-	-	-	-	-	+	-	-	I	0,05
H	Eua	3,5	2	0	P	*Vicia sylvatica*	-	-	-	-	-	-	-	+	-	-	I	0,05
						Querco-Fagetea												
H	Eua	3	3	4	P	*Geum urbanum*	+	+	+	+	+	1	+	+	-	+	V	0,90
H	Cosm	4	2,5	0	P	*Athyrium filix-femina*	+	-	+	+	+	+	1	-	+	-	IV	0,80
MPh	E	3	3	4	D	*Fraxinus excelsior*	+	+	+	-	+	+	+	-	+	+	IV	4,50
H	Eua	3	3	4	D,P	*Brachypodium sylvaticum*	-	+	-	+	+	+	-	+	-	+	III	0,30
MPh	E	3	3	3	P	*Carpinus betulus*	+	+	1	+	+	-	-	-	-	1	III	1,20
MPh	E	3	3	3	D,P	*Cerasus avium*	-	-	-	-	+	+	+	-	+	+	III	0,25
MPh	Eua	3	3	3	D,P	*Acer platanoides*	-	-	-	-	-	-	+	-	+	+	II	0,15
G	E	3,5	4	0	P	*Anemone nemorosa*	-	-	-	-	+	-	+	-	-	+	II	0,15
G	Ec	3,5	3,5	4	P	*Arum maculatum*	-	+	-	+	-	+	-	-	-	-	II	0,15
MPh	Eua	3	2	2	P	*Betula pendula*	-	-	-	-	-	-	-	+	1	+	II	0,60
G	Ec	3	3	4	P	*Cardamine bulbifera*	-	+	-	-	+	-	+	-	-	+	II	0,20
H	Cosm	4	3	0	P	*Dryopteris filix-mas*	-	+	-	-	+	+	-	-	-	+	II	0,20
H-Ch	Mp	2,5	3	4	P	*Glechoma hirsuta*	-	-	-	-	+	-	-	+	-	+	II	0,15
Th	Cosm	3,5	3	3	P	*Geranium robertianum*	-	+	-	-	-	+	-	-	+	+	II	0,20
l-nPh	Atl-M	3	3	3	P	*Hedera helix*	-	-	-	-	+	+	-	+	-	+	II	0,20
H	E	3	3	0	D	*Mycelis muralis*	+	+	+	-	-	-	+	-	-	-	II	0,20
MPh	Eua	4	3	3	P	*Ulmus glabra*	-	-	-	+	-	+	-	-	-	+	II	0,15
H-G	End	3	2	3	D	*Symphytum cordatum*	-	+	-	+	-	-	-	-	-	+	II	0,15
H	Eua	3	3	3,5	P	*Viola reichenbachiana*	-	+	-	-	-	+	-	+	-	+	II	0,20
MPh	Ec	3,5	3	3	P	*Acer pseudoplatanus*	-	+	-	+	-	-	-	-	-	-	I	0,10
G	Cp	3,5	3	5	P	*Asplenium scolopendrium*	-	-	-	+	-	-	-	-	-	-	I	0,05
Th-TH	Eua	3	3	4	P	*Alliaria petiolata*	-	-	-	-	-	-	-	-	-	+	I	0,05
H	Eua	3	3	4	D	*Astragalus glycyphyllos*	-	-	-	-	+	-	-	-	-	-	I	0,05
H	Eua	3	2	2	D,P	*Cruciata glabra*	-	-	-	-	-	+	+	-	-	-	I	0,10
TH	E	4	3,5	4	D	*Dipsacus pilosus*	+	-	-	-	-	-	-	-	-	-	I	0,05
G	End	4	2,5	4	P	*Dentaria glandulosa*	-	+	-	-	-	-	-	-	-	-	I	0,05
Ch-H	Eua	3,5	3	0	D,P	*Glechoma hederacea*	-	-	-	-	-	+	+	-	-	-	I	0,10
Th-TH	Eua	2,5	3	3	D	*Lapsana communis*	+	-	+	-	-	-	-	-	-	-	I	0,10
mPh	E	2,5	3	3	D	*Ligustrum vulgare*	-	-	-	-	-	-	-	+	-	+	I	0,10
mPh	E	2	3	4	D	*Pyrus pyraster*	-	-	-	-	-	-	+	-	-	+	I	0,10
H	Eua	3	2	5	D	*Primula veris*	-	+	-	-	-	-	-	-	-	-	I	0,05
H-G	Eua	3,5	3	3	P	*Ranunculus ficaria*	-	-	-	-	-	-	-	-	-	+	I	0,05
H	Eua	3	3	0	P	*Trifolium medium*	-	-	-	-	+	-	+	-	-	-	I	0,10
G	E	3,5	3	4	D,P	*Scilla bifolia*	+	-	+	-	-	-	-	-	-	-	I	0,10
Th	Eua	2,5	3	4	P	*Veronica hederifolia*	-	-	-	+	-	-	-	-	-	-	I	0,05
						Galio-Urticetea												
H	Eua	3	3	4	D	*Anthriscus sylvestris*	+	+	+	+	+		+	-	+	-	IV	0,35
H-G	Cosm	3	3	4	P	*Urtica dioica*	+	-	2	-	+	+	+	-	-	+	III	2,00
Th	Cp	3	3	3	P	*Galium aparine*	-	+	-	-	+	+	-	+	-	-	II	0,20
H	Eua	3,5	3	4	D	*Salvia glutinosa*	-	-	-	+	-	-	+	-	-	+	II	0,15
H	Eua	3,5	3	3	D,P	*Aegopodium podagraria*	-	-	-	-	-	+	-	+	-	-	I	0,10
Th	Eua-C	3	2	0	D	*Galeopsis speciosa*	-	-	+	-	-	-	-	-	-	-	I	0,05
						Rhamno-Prunetea					-							
mPh	E	3	3	3	P	*Sambucus nigra*	+	-	+	+	-	+	+	+	+	+	IV	0,40
mPh	E	2,5	3	3	D	*Crataegus monogyna*	-	+	-	+	-	+	+	+	-	+	III	0,30
mPh	E	3	3	3	D	*Corylus avellana*	+	-	+	-	+	-	+	-	-	+	III	0,25
mPh	Ec	3	3	4	D	*Cornus sanguinea*	+	-	+	-	+	-	-	-	-	+	II	0,20
l-nPh	Ec	3	3	3	D	*Clematis vitalba*	-	+	-	+	-	-	+	-	-	-	II	0,15
mPh	E	3	3	3	P	*Evonymus europaeus*	-	+	-	+	-	-	-	-	+	-	II	0,15
mPh	Cp-Bo	4	3	4	D	*Viburnum opulus*	-	-	-	+	-	+	-	-	+	-	II	0,15
MPh	E	2,5	3	3	D	*Acer campestre*	-	+	-	-	-	-	-	-		-	I	0,05
nPh	E	2	3	3	P	*Rosa canina*	-	-	-	-	+	-	-	+	-	-	I	0,10
						Vaccinio-Piceetea												
H-G	Cp-Bo	4	3	3	D	*Oxalis acetosella*	-	+	-	-	+	+	-	-	+	+	III	0,25
MPh	E	0	0	0	D	*Picea abies*	+	-	-	+	-	-	-	1	-	-	II	0,60
G	Eua	4	2,5	4	D,P	*Veratrum album*	+	-	-	-	-	-	-	+	-	-	I	0,10

						Molinio-Arrhenatheretea											
H	Cosm	4,5	3	3	P	*Juncus effusus*	+	+	-	1	-	+	+	+	+	+	IV	0,85
H	Eua	4	0	0	P	*Ranunculus repens*	+	-	+	+	-	+	-	+	+	-	III	0,30
H	Eua	4,5	2	0	D,P	*Filipendula ulmaria*	-	+	-	+	-	-	+	+	+	-	III	0,25
TH	E	3	2,5	3	D,P	*Campanula patula*	-	+	-	-	+	-	-	+	-	-	II	0,15
H	Eua	4,5	3	4	P	*Mentha longifolia*	+	-	+	-	-	-	-	+	-	-	II	0,15
H	Eua	3	0	0	P	*Achillea millefolium ssp. millefolium*	+	-	-	-	-	+	-	-	-	-	I	0,10
H	Eua	4	3	4	D	*Cirsium oleraceum*	-	+	-	-	-	+	-	-	-	-	I	0,10
H	Eua	3	0	4	P	*Dactylis glomerata*	-	-	-	+	-	+	-	-	-	-	I	0,10
G	Cosm	3	3	0	P	*Equisetum arvense*	-	-	-	-	+	-	-	-	-	-	I	0,05
H	Cp	5	3	0	D,P	*Galium palustre*	-	-	-	-	-	-	-	-	+	-	I	0,05
H-Hh	Cp	5	2,5	0	P	*Lythrum salicaria*	+	-	-	-	-	-	-	-	-	-	I	0,05
H	E	4	3	4	P	*Lunaria rediviva*	-	-	-	+	-	-	-	-	-	-	I	0,05
mPh	E	3,5	3	4	D	*Malus sylvestris*	-	-	-	-	-	+	-	-	-	-	I	0,05
H	Eua	3,5	3,5	3,5	P	*Polystichum aculeatum*	-	-	-	+	-	-	-	-	-	-	I	0,05
H	Cp-Bo	3	3	0	P	*Prunella vulgaris*	-	-	-	-	+	-	-	-	+	-	I	0,10
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
H	Eua	3,5	0	0	D	*Ranunculus acris*	+	-	+	-	-	-	-	-	-	-	I	0,10
						Phragmitetea australis											
Hh	Eua	5	3	0	D	*Lycopus europaeus*	+	+	+	1	-	+	+	-	+	-	IV	0,80
H-Hh	Eua	5	0	0	P	*Lysimachia vulgaris*	+	+	-	+	+	-	-	+	-	-	III	0,25
H	Cp-Bo	4,5	0	0	P	*Caltha palustris*	-	-	-	+	+	-	-	-	+	+	II	0,20
Hh	Eua	5	3	0	P	*Myosotis scorpioides*	+	-	-	-	-	+	-	+	-	-	II	0,15
Hh	Cp	6	0	0	D	*Alisma plantago-aquatica*	+	-	-	-	-	-	-	-	-	-	I	0,05
Hh	Eua	5	3	0	P	*Mentha aquatica*	-	-	-	+	-	-	-	-	-	-	I	0,05
Hh	Cosm	6	0	4	P	*Phragmites australis*	-	-	-	-	-	+	-	-	-	-	I	0,05
Hh-G	Cp-Bo	4,5	3	0	P	*Scirpus sylvaticus*	-	-	+	-	-	-	-	-	-	-	I	0,05
						Variae Syntaxa											
mPh	Eua	5	3	4	P	*Salix alba*	+	-	1	+	-	+	-	-	-	+	III	0,70
Hh	Eua	6	3	4	P	*Carex acutiformis*	-	+	-	-	+	-	-	-	+	-	II	0,15
H	E	5	4	4	P	*Carex riparia*	-	-	-	+	-	-	+	+	-	-	II	0,15
Th	Adv	4	0	4	P	*Erigeron annuus*	+	-	+	-	-	-	-	+	-	-	II	0,15
H-Ch	Cp	3	3	4	P	*Artemisa vulgaris*	-	-	-	-	-	+	-	-	-	-	I	0,05
H	Eua	4	3	3	D	*Eupatorium cannabinum*	-	-	+	-	-	-	-	-	-	-	I	0,05
Th	Eua	3	0	4	D	*Lamium purpureum*	-	-	-	-	-	-	-	-	-	+	I	0,05
G	Cosm	3	3	0	P	*Pteridium aquilinum*	-	+	-	-	-	-	-	-	-	-	I	0,05
G	Eua	2	3	4	D	*Polygonatum odoratum*	-	-	-	-	-	+	-	-	-	+	I	0,10
nPh	Cp	3	3	3	D,P	*Rubus idaeus*	-	-	+	-	-	-	-	-	+	-	I	0,10
MPh	B	2,5	3	3	D	*Tilia tomentosa*	-	-	-	+	-	-	-	+	-	-	I	0,10

Location and date of relevé recordings: 1-3. Bârzava River floodplain, 24th July 2018; 2. Semenic River Valley, 24th August 2018; 4. Râul Alb River Valley, 5th May 2016; 5. Bârzava River floodplain near Casa Mihăilescu, 24th July 2018; 6. Râul Alb River Valley near Lacul Secu, 25th July 2017; 7. In the bed of the Bârzava River near the Groposu forest lodge, 26th July 2018; 8-9. In the bed of Grădiștea stream, 25th July 2018; 10. On a small stream of the Bârzava River, 6th May 2016.

CONCLUSIONS

Our scientific approach has culminated in the groundbreaking completion of a detailed inventory of all vascular plant species, accompanied by a phytocenological, ecological, and eco-protective analysis of the association. The purpose of this approach is to conserve the biodiversity present in this territory.

The plant community, *Stellario nemori-Alnetum glutinosae* (Kästner 1938) Lohmeyer 1957, belongs to habitat type R4402, Daco-Getic black alder (*Alnus glutinosa*) floodplain forests with *Stellaria nemorum* NATURA 2000: 91E0 Aluvial forest with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*), with very high conservation value.

In the studied area, the analyzed phytocoenosis is well represented along the mountain valleys, albeit mostly in the form of bands approximately 5-10 meters wide, along the Bârzava River floodplain, Semenic River valley, Râul Alb River valley, Bârzava River floodplain-Mihăilescu House, near Secu Lake in the Râul Alb River bed, near the Groposu forest lodge in the Bârzava River bed, in the Grădiștea brook bed, and a small brook of the Bârzava River, which are flooded several times a year (from a few hours to several days).

In the herbaceous layer, several species with significant stability stand out, alongside *Stellaria nemorum*, such as *Circaea lutetiana*, *Impatiens noli-tangere*, *Carex sylvatica*, *Stachys sylvatica*, *Pulmonaria officinalis*, *Asarum europaeum*, *Geum urbanum, Athyrium filix-femina,* and *Anthriscus sylvestris*. These species coexist with tall marsh plants and species characteristic of marshy areas. The heterogeneity of the floristic composition for the plant communities included in the *Stellario nemori-Alnetum glutinosae* (Kästner 1938) Lohmeyer 1957 association is influenced by altitudinal variations and soil moisture levels. The level of human impact on this plant community is quite low.

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