

THE *POTENTILLO MICRANTHAE-QUERCETUM DALECHAMPII* ASSOCIATION IN THE LOWER BASIN OF THE MOTRU RIVER - ROMANIA

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Abstract: From the geographical point of view, the Lower Basin of the Motru River lies in the western part of the Getic Piedmont, with the coordinates: 44°55' north latitude and 23°45' east longitude. The studied area covers 691 Km². The physical-geographical position and the pedo-climatic particularities specific to the territory under research confer the vegetation a mosaic nature with a particular specificity, determined by the quite strong Balkan and sub-Mediterranean influences. With the territory under research located just on the line between the nemoral area (of the oak forests) and the floor of the hilly common oak (up to the sub-Carpathian Hills), we cannot talk about the presence of the acidophilus common oak forests, which is characteristic to the sub-Carpathian region. In this transition area, between the altitudes (200) 250 and 380 (402) m, we have identified mixed common oak forests, associated with Hungarian oak and Turkey oak, belonging to the association *Potentillo micranthae-Quercetum dalechampii* A.O.Horvát 1981 (Syn.: *Potentillo micranthae-Quercetum (petraeae) resp. dalechampii-cerris*) A.O.Horvát (1956) 1959). The affiliation of these phytocoenoses to the above mentioned association is done according to its transition association nature, between the silvosteppe forests and the mesophyle, acidophilus forests in the sub-Carpathian area of Oltenia.

Key words: association, *Potentillo micranthae-Quercetum dalechampii*, Basin, Motru, Romania, transition.

Introduction

From the geographical point of view, the Lower Basin of the Motru River is located in the western part of the Getic Piedmont, with the coordinates: 44° 55' north latitude and 23° 45' east longitude. The investigated territory covers 691 Km². From the administrative-territorial point of view, the territory under research is at the border between the counties of Mehedinți and Gorj, which starts from the eastern part of the Negoșți Hills (Comănești-Mehedinți, alt. 388 m) and reaches the Jiu Valley near the locality of Gura Motrului (alt. 110 m). Being situated in the southwestern part of the country and of the Getic Piedmont, the territory under research has a central-European climate with Mediterranean influences. The valleys are not so deep, and the crests more matured; nevertheless, the slope processes are active, with a maximum intensity on deforested slopes. The slope processes developed due to the rock nature, favorable to denudation, quick withdrawal of the gradients to the axis of the interfluves. This fact contributed to wider valleys and extended river meadows.

Between the eastern limit of the Mehedinți Plateau, the western passage of the Jiu river and especially to the long valley of the Hușnița River (in South), stands out the Motru Piedmont (with a surface of about 1837 Km²), within its territory being separated, westward to Motru, the lower region of the Coșuștei Hills.

The *Coșuștei Hills* appear as a prolonged chain of summits, separated by large valleys, generally a more evolved relief, relatively more gently, that from the eastern side of

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the Jiu River. The prolonged summits dominate, in some sections, the valley, like the northern and southern ones, of about 150m, the Motru valley, for example, is dominated by the hilled summit of the Comănești (388m) and the Șovarna valley dominated by a hill with the same name (402m) and others [35].

The Coștuștei and the Ohabei Hills (on the right side of the Motru till the Ohabei Valley) and the Bujornescu-Runcurel (between Cămuești and Motru) are considered to be hills of transition between Strehaia Platform and the SubCarpathian Hills [19]. Within the Strehaia Platform stands out: the Hușniței Platform, bordered by the Ohaba Valley (Ohaba place) and Hușniței Valley (Strehaia) and Bălăciței Platform bordered between the Hușniței Valley and the Jiu Valley, as well as the Gruuiurile Argintestilor (between Motru and Argintești) which are considered piedmont relic units.

The Bălăciței Plateau (or Bălăciței Platform), within whose territory the researched area also belongs, between the Hușniței Valley (Strehaia) and Gura Motrului, is a mild high piedmont villafranchin plain in the researched area (over 300 m, in contrast to those southward of little over 200 m), fragmented (northwards and northeastern) by the smaller tributaries (Slătincul Mare, Breznița), with inferior flow.

Method of research

In the study on vegetation, the association was considered the main coenotaxonomic unit, comprehended in the central-European school spirit; however, we have also taken into account the new orientation to define the association as a “fundamental unit of phytosociology, an abstract concept, which is reflected in an ensemble of association individuals who have in common almost the same floral, statistical, ecological, dynamic, chronologic and historical characters” [11]. The study of the phytocoenoses and the vegetal associations has been performed by using the phytocoenologic survey method, based on the methodology foreseen by Braun-Blanquet and adapted to the vegetation’s particularities in our country [7, 17]. The nomenclature of the superior syntaxons was adopted after Rodwell & al. [30], taking into considerations other scientific papers [1, 2, 7, 11, 20].

Results and discussion

QUERCETEA PUBESCENTIS Doing-Kraft ex Scamoni & Passarge 1959

The class subordinates the thermoxerophyle-mesoxerophyle forests of the temperate zone, which define the belt position between the mesophyle and acidophyle forests from the Class of *Quercus-Fageta* and the ultra-xerophyle, Mediterranean ones of the *Quercetia ilicis* Class [7, 30]. Initially, the coenotaxonomic classification was made after [1, 2, 20], from the Class of *Quercetia pubescenti-petraeae* (Oberd. 1948) Jakucs 1960 [6].

QUERCETALIA PUBESCENTI-PETRAEAE Klika 1933

The affiliation to this alliance is made according to the presence of the central-European and the eastern elements from the described associations, which show the specific character of the zone [7, 30].

The approach of the forests classification in Oltenia and in the south of the Mehedinți Plateau [31], was made according to Jakucs 1960, 1961 [4, 23, 27, 28]; the approach was justified by the descriptions. The affiliation of these types of forests was made differently throughout the time. Therefore, Jakucs 1960 groups these forests within the alliance *Orno-Cotinetalia* on the account of the central and eastern under Mediterranean element, approach that is made also by Soó [36] and Borhidi [1, 2] grouping these forests in the *Quercetalia cerris* alliance, based on the subcontinental – SubMediterranean elements.

In Oltenia as well as in the whole country, all the studies of the wooden associations are based on the silvic descriptions [12, 13, 14, 15, 21].

Pop & Cristea [26], as a result of the comparative study of the enlightened associations of Turkey oak and Hungarian oak at national level, emphasizes the same identified meridional elements in the Inferior Basin of the river Motru as well, but they subordinate these elements according to the descriptions made by Klika 1933, based on the latest chronological data regarding the SubMediterranean species *Quercus cerris* and *Q. frainetto*, as well as the informational data of Oberdorfer (1992). Both classifications are justified and fair, but, in Motru Basin, the tasks of subordinating these associations derive from its geographical position and the multiple Mediterranean influences that differ from the descriptions made. However, within the analysis of the associations' characteristics from the point of view of the phytogeographic element, one could notice that on the background of the European elements' domination, central-European and the eastward ones occupy a percentage of 12%, where as the Subcontinental elements (SubMediterranean, Mediterranean), about 20%, being also present elements from Central and Western Europe. There can also be encountered Balkan, Pontic, and Panonic influences, which determine a specific character of the associations, and the difficulty of their affiliation.

Quercion farnetto I. Horvat 1954

The classification within the alliance is made on the account of the characteristic species encountered in the researched area, some of these are rare and were not mentioned in surveys: *Campanula sphaerothrix*, *Silene viridiflora*, *Acanthus balcanicus*, *Crocus flavus* etc.

Mesoxerophyle, mesothermophyle-subtermophyle Forests

Potentillo micranthae-Quercetum dalechampii A. O. Horvát 1981

(Syn.: *Potentillo micranthae-Quercetum (petraeae* resp. *dalechampii-cerris)*
A.O.Horvát (1956) 1959)

The phytocoenoses, emphasized by the oak species (*Quercus petraea*, *Q. dalechampii*, *Q. polycarpa*), seldom with Turkey oak and rarely Hungarian oak, were included in the above mentioned association., because the separation of these on the account of their composition and sublayer led to no clear result; in all the approached variants the floristic composition is generally the same. This situation can be explained taking into account the above mentioned general characteristics of the area. On the other hand, the narrow surfaces where the mixed common oak forests are, the mosaic of the phytocoenoses, which crosses them, explain the presence of the transgressive species from the Hungarian oak and hornbeam forests. The microclimate characteristic to this zone determines vegetation inversions (small groups of common oaks at 180-200 m altitude, on northern exposure, which moves further with the Hungarian-Turkey oak forests at 200-275 m altitude), this situation being frequently encountered (the place Mitulani-Buicești from Bălăciței Platform).

Such vegetation inversions are located also by Maloș in the Superior Basin of the river Motru.

The mixed common oak forest from the transition hills is in an advanced stage of degradation, on the interflow Crainici (The Hills Coștuștei and Ohabei, the places Negoești, Pistrița, Bala (Comănești, Valea Mare, Molani, Brativoești, Crainici, Lupca etc.), towards Ciovârnașani - Mehedinți; and on the left side of the Motru River, the Hills Bujorăscu-Runcurel, between Glogova and the Perilor Valey), between the SubCarpathian Hills and Strehaia Platform), the substrate is represented by rendzinic soil.

In these areas, the mixed common oak forest is located only on the summit of the hills and on south exposure where they come into contact, especially with the Turkey oak, because on the north exposure the hills are populated with moesic beech trees. This can be also noticed from the analysis of *Tab. 1*; in all surveys, the semiparasite epiphyte *Loranthus europaeus* indicates a strong attack that leads to the destruction of the common oak forest.

Therefore, the hundred acres surfaces are replaced by acacia plantations, while the common oak forest becomes very rare. In this area, one can also notice the more progressive invasion of the juniper tree *Juniperus communis var. communis* (Groza [16], described by the juniper tree communities in the Craiului Mountains Forest, belongs to *Prunion spinosae*), which forms in the glades of the common oak forest facies, *juniperosum communis* fac. nov. (**Tab. 1**, relevé no. **2, 9**). Holotypus hoc loco: **Tab. 1**, relevé no. **2**. The large ground-surfaces are young forests for regeneration, without limit, without a bushy and grassy layer.

As Roman [31] mentioned in the south of the Mehedinți Plateau, the dominant species is *Quercus daleschampii*, characteristic for this south-western part of Oltenia and Banat.

Quercus polycarpa is less abundant on the skeletal soils, rocky, southern exposure, on the transition hills, (characteristic, generally speaking, to the descriptions made by Popescu [28], in the *Quercetum polycarpae-cerris* association, which is also cited in the case of Strehaia).

Quercus petraea (with small AD indices) stands out on plateaus, northward exposure, north-western, crossing the hornbeam grove and the beech tree forest.

This combination is presented by Roman as well, in the south of the Mehedinți Plateau, and because of this he does not describe any association of these forests; Maloș [18] cites from the Upper Basin of the Motru River and includes the common oak forest in *Carpino-Quercetum petraeae* Borza 1941, in the Jurassic and Cretacic limestone, crystalline schists (alt. 400-800 m) at Ponoarele; Zaharia [37] in the Gilort Basin, describes the common oak forest within the association *Quercetum petraeae-cerris subas. Quercetosum polycarpae* Borza 1931; Păun [22, 23] describes the *Quercetum medio-europaeum mixtum dacicum* association Borza 1931 from the region Balș; Ciocârlan [5], in the Subcarpathic Basin of the Slătinicului by Buzău; Sanda & al. [9] incorporates the common oak forest from the region between Motru and Negoești to the large vegetation unit of the moesiaca oak forests (G12 - *Quercus polycarpa*, *Q. dalechampii* with *Helleborus odorus*, *Digitalis grandiflora*, *D. lanata*) and Balcanic-Carpathian forests of oak, Turkey oak and Hungarian oak (G13- *Quercus polycarpa*, *Quercus cerris*, *Q. frainetto*, *Q. dalechampii* with *Lathyrus niger*, local *Ruscus aculeatus*, without mentioning the presence of the *Q. petraea species*, which he incorporates to the same unit for Banat and Crișana.

In The Babadag Plateau [8] and in The Cernei, Țarcu and Godeanu Mountains [3], the authors describe the emphasized associations of *Q. dalechampii*.

From the comparative analysis of the floristic composition, of the phytocoenoses that have been studied in the Lower Basin of the Motru River and from the many descriptions according to the above mentioned authors, one can notice the same elements that define the association. That is, the presence of a large group of species related to the characteristics of the southern microclimate generated by the SubMediterranean, Balkan, Pontic, and Panonic influences.

Therefore, I considered that the presence of the characteristic species of *Quercetalia pubescenti-petraeae* order: *Fraxinus ornus*, *Helleborus odorus*, *Sorbus domestica*, *Acanthus balcanicus* etc., define the characteristics of the area. The species: *Quercus cerris*,

Q. frainetto, *Ruscus aculeatus*, *Lychnis coronaria* etc., define the alliance, and *Potentilla micrantha*, the central European-Mediterranean species, present the spreading-geographic relations between these mixed common oak forests and the Hungarian oak groves, in the context of the microclimate that appears in this region of the country, because of the Carpathians.

The phytocoenoses of the association were identified on the eastern and south-eastern exposure, on plateaus and slopes of the Ohabei and Comănești Hills and of the Lupșei Hills, at heights of 330-380 m.

The predominant soils are erodisols and regosols, with unconsolidated rocks, poor in humus and white-acid, and also the brown soils of forest at different podzolized stages.

The level of coverage within the layer of trees is 80-90 (100) %. Within the layer of trees, beside the three species of oak, we can encounter: *Tilia tomentosa*, *Sorbus domestica*, *Fraxinus ornus*, *Acer pseudoplatanus*, *Cerasus avium* var. *avium* (valuable taxon, which is also of high interest for the culture "in vitro", topic carried out within the C.N.C.S.I.S. Grant Bucharest: "Reproduction in vitro of some valuable wooden species", coordinated by Dr. Mihaela Corneanu) etc.

The bushy layer is absent, and within the grassy layer there are present: *Poa nemoralis* (most frequent, sometimes with high abundance-dominance as well), accompanied by small groups of *Festuca drymeja*, *F. pseudodalmatica* (rarely bushes), *Asparagus tenuifolius*, *Potentilla micrantha*, *Helleborus odorus*, *Polygonatum latifolium*, *P. odoratum*, *Geum urbanum*, *Viola reichenbachiana*, *Melica uniflora*, *Hieracium murorum*, *Galium schultesii*, *Lathyrus niger*, *L. vernus*, *Luzula forsteri*, *Lapsana communis* subsp. *adenophora* etc.

The transition character of the association is emphasized by the presence of the xero-xeromesophyle (typical for the silvosteppe zone) and mesophyle elements (typical for the under- Carpathian Hills), imposing therefore the mesophyle character of these forest; by the thermophile elements on the one hand, and by the microtherm one on the other hand, towards north, emphasizing the meso-thermophyle-subthermophyle character.

The soil's reaction indicates the moderate reaction of the acid-neutrophyles; but the geoelements specter highlights the central European character, with a important participation of meridional elements, the circumpolar element being also present on a eurasiatic dominance.

Conclusions

The paper presents, in detail and for first date in Oltenia region and otherwise in Romania, the **Potentillo micranthae-Quercetum dalechampii** A. O. Horvát 1981 association, emphasizing the transition character of the mixed common oak forest from the Lower Basin of Motru River.

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Cosm. *Geranium robertianum* +I (3, 4, 5); Am. de N. *Robinia pseudoacacia*, Medit. *Cynosurus echinatus* +I (9,11).

Bryophyta																	
Hypnum cupressiforme	2	2	2	2	2	2	+	2	+	+	2	2	2	2	3	3	V
Atrichum undulatum	1	1	1	+	+	+	+	+	-	+	-	-	+	+	+	+	V
Dicranum scoparium	1	1	1	-	+	+	+	+	-	+	-	+	1	+	+	+	V
Polytrichastrum formosum	1	1	1	-	1	1	1	-	1	1	1	1	1	1	-	-	IV
Racomitrium canescens	+	+	-	-	+	+	+	-	2	-	2	2	-	-	-	+	III
Plagiomnium undulatum	+	+	1	+	-	+	-	+	-	+	-	-	+	1	+	-	III
Plagiothecium undulatum	-	+	+	-	+	-	+	+	-	+	-	-	+	-	+	-	III
Scleropodium purum	-	+	-	+	-	-	-	+	1	+	1	+	-	+	-	-	III
Plagiomnium affine	+	-	-	-	-	+	-	+	-	+	-	1	+	1	+	-	III
Hypnum cupressiforme var. filiforme	+	-	-	+	-	+	+	-	-	-	-	+	-	-	+	-	III
Bryum argenteum	+	-	+	-	-	-	+	+	-	-	-	-	+	+	-	-	III
Ceratodon purpureus	-	+	-	+	-	+	-	+	-	+	-	-	-	-	+	-	II
Brachythecium salebrosus	+	-	-	+	+	-	+	-	-	-	-	-	-	-	+	+	II

Species presents in a single relevé (+/I): Euras. *Epipactis helleborine*, Centr. eur.-subatl. *Epipactis purpurata*, Balc. *Euphorbia jacquini*, Eur. *Euonymus europaea*, Centr. eur. *Luzula luzuloides*, Eur. *Ulmus minor*, Euras. **Pinus sylvestris*, Euras. *Stachys sylvatica* (1); V, centr. eur.-medit. *Arum orientale*, Euras. *Actaea spicata*, Balc. *Digitalis ferruginea*, Eur. *Rumex sanguineus*, *Salvia glutinosa*, Cosm. *Pteridium aquilinum* (2); Centr. eur.-medit. *Aremonia agrimonioides*, Balc. *Fagus sylvatica* subsp. *moesiaca*, Eur. centr. and by south. *Scilla bifolia*, Eur. centr. *Pulmonaria mollis*, Pont.-medit. *Scutellaria altissima*, Eur. *Malus sylvestris* (3); Eur. centr. *Tilia platyphyllos* subsp. *cordifolia* (4); Submedit. *Primula acaulis*, Eur. centr. (submedit.) *Viburnum lantana*, Pont.-balc.-pan. *Ruscus hypoglossum*, Submedit. *Agrimonia eupatoria* subsp. *grandis* (7).

Place and date of the relevés: 1. Glogova Hill, Glogova (on the left side of the area Motru-Gorj, by the limit area with Mehedinți), 04. VI. 2000, 03.V.2003; 2. Culmea Motrulului Hill, Comăneștilor-Mehedinți, on the same hill with Hill Glogovei, 04. VI. 2000, 22.VIII. 2002, 27.VI.2004; 3. Cerângani Hill, on the plateau, between Ogașul Lepreșului and Ogașului Ștubeu (51, 52, 53, N-V by Strehaia), 17. IV.2000, 30. V. 2000; 4. Between Lepreșului, Lupoaiiei, 09.VII 2003; 5. Ogașului Ștubeu, Cerângani, 09.VII 2003; 6. Ciochiuța Hill (Ciochiuța-Strehaia), 01.VII.2003; 7. Pârvueștilor Hills, between Codrun and Pârvuești (Corcova), the interflow Coșuștei, 21.IX.2003; 8, 9. Pestrîței Hills, Călugăriței, village Pestrîța (Bala), rocky surface 11. IX. 2002, 27.VI.2004; 10. Bratîvoești Hill (Bala), 11. IX. 2002, 27.VI.2004; 11. Interflow Crainici, Crainici (Bala), 11. IX. 2002, 27.VI.2004; 12. Cracul Priporulului, Iormănești (Glogova-Gorj), 09.VII.2002; 13. Priba Mică Hill, Olteanu (Glogova), 09.VII.2002; 14. Bălțatului Hill, Cătunele, 09.VII.2002; 15. Râpa lui Gulie, between Câmpu Mare and Sărdănești, 21.VIII.2002; 16. Interflow Valea Mare, village Valea Mare (Bala), 23.VII.2004; 17. Piscul lui Busan, Buicești, 17.IV.2004; 18. Dosul Culmii Hill, Gura Motrulului, 30.IV.2004.