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NEW PLANT COMMUNITIES IN THE BAIA MARE DEPRESSION BELONGING TO THE CLASSES ARTEMISIETEA VULGARIS LOHM. *ET AL.* IN R. TX. 1950 AND QUERCO-FAGETEA BR.-BL. ET VLIAGER 1937

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ABSTRACT: The north-western part of the country has not been thouroughly surveyed as far as the inventory and the composition of the plant communities is concerned.In this area of the country the number of works written on this subject is restrained to some idle articles which can hardly cover the picture regarding the plant communities in the Baia-Mare Depression.
KEY WORDS: plant communities, Maramureş County, Baia Mare Depression, Tanaceto-Arthemisietum vulgaris, Querco robori-Carpinetum.

INTRODUCTION

The Baia Mare Depression, which lies in the western part of the Maramureş County, represents an interesting area from an ecological and a botanic point of view. The climate in this region is warm and moist, which triggers about the appearance of a rich flora vegetation, unfortunately little spoken of in the literature of speciality. Besides the plant communities described in the literature of speciality in the Baia Mare Depression mainly by Mititelu D. am Dorca Mariana, we have discovered and described several new communities in the area under research, out of which we can mention Tanaceto-Arthemisietum vulgaris Br.-Bl. 1949 and Querco robori-Carpinetum Soó et Pócs (1931) 1959.

MATERIALS

The materials used are represented by the data collected in the field through the phytosociologic survey, catalogues and the special bibliography that is presented further on.

METHOD

The research methods used consisted in the studying, ordering and interpreting of the data (annotation) colected in the field with the ones in the literature of speciality.

Thus, the picking and determining of plants has been carried out in accordance with the works „*A Magyar flora kepekben*" Javorka *et al*., 1958; „*Flora R. P. România*, *R. S. România*", I-XIII, 1952-1976; „*Flora Europaea*", 1964-1980, I-IV, Ediția a II-a, 1993; „*Flora ilustrată a României*", Ciocârlan, 2000 şi după „*Flora of North America*", 2008.

The analysis of the data has been carried out in accordance with the Central European phytosociology system Braun-Blanquet, indicated de Pop, 1982, Barkman *et al*., 1986, „*Code of phytosociological nomenclature. Vegetatio*", vol. 67, 3: 145-197, „*Conspectus of European vegetation. Folia Geobot. Phytotax*", Mucina, 1997-32: 117-172, Cristea *et al*., 2004, Sanda *et al*., 2001, Sanda *et al*., 2007, whereas the specific phytosociologic surveys achieved after: Mucina, 1997, Cristea *et al*., 2004, Sanda *et al*., 2001, Sanda *et al*., 2007.

The bioform, the geoelement and the ecological factors (U, T, R) have been completed in accordance with the work „*Studii şi comunicări*" Supliment 25, Ştiinţe Naturale, 1983, written by Sanda *et al*., updated in accordance with the work „*Fitosociologie*", Cristea *et al*., 2004.

RESULTS AND DEBATES

Cls. Artemisietea vulgaris Lohm. *et al*. in R. Tx. 1950

Ord. Onopordetalia acanthii Br.-Bl. et R. Tx. ex Klika et Hadač 1944

Al. Arction lappae R. Tx. 1937

As. Tanaceto-Arthemisietum vulgaris Br.-Bl. 1949

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Chart 1. The Tanaceto-Artemisietum vulgaris community

					Nr. of annotation	1	2	3	4	5	
					Altitude	145	145	145	145	145	
					Exposure	-	-	-	-	-	
					Slope	-	-	-	-	-	K
					Coverage (%)	95	100	95	95	95	
Biof.	Geoelem.	U	T	R	Surface (m²)	25	25	25	25	25	
					Char. Ass.						
H-Ch	Cp(Bor)	3	3	4	*Artemisia vulgaris*	+	1	1	+	1	V
H	Eua	3	3	0	*Tanacetum vulgare*	4	5	5	4	3	V
					Arction						
TH	Eua(M)	3	3	3	*Arctium lappa*	-	-	-	+	+	II
H-G	Cosm	0	0	0	*Convolvulus arvensis*	+	+	+	-	-	III
					Artemisietea						
Th-TH	Eua(M)	2,5	3	0	*Bromus arvensis*	-	-	+	-	-	I
Th	Eua	1,5	4	4	*Bromus squarrosum*	-	-	+	-	+	II
G	Eua(M)	0	0	0	*Cirsium arvense*	+	+	+	+	-	IV
TH	Eua(cont)	4	3,5	4	*Dipsacus laciniatus*	+	-	+	-	-	II
G	Eua	0	0	0	*Elymus repens*	2	+	+	1	2	V
G	Cosm	3	3	0	*Equisetum arvense*	-	+	+	+	-	III
Th-TH	Eua(M)	1,5	3,5	0	*Lactuca serriola*	+	-	-	-	-	I
Th-TH	Eua	2,5	3	0	*Melilotus albus*	+	-	-	-	-	I
Th-TH	Eua	2,5	3,5	0	*Melilotus officinalis*	-	+	-	-	+	II
TH	Adv	2	4	0	*Oenothera biennis*	+	-	-	-	-	I
H	Eua	2	4	2	*Potentilla argentea*	-	-	-	+	-	I
H	Eua(M)	3	0	0	*Taraxacum officinale*	+	-	-	-	-	I
Th	Adv	2,5	4	0	*Xanthium albinum* ssp. *riparium*	-	-	-	+	-	I
					Molinio-Arrhenatheretea						
H	Eua	3	0	0	*Achillea millefolium*	-	+	+	+	+	IV
H	Cp(bor)	0	0	0	*Agrostis capillaris*	+	-	-	+	+	III
H	E(M)	3	2,5	0	*Bellis perennis*	+	-	-	-	-	I
H	Eua	3	0	0	*Centaurea jacea*	+	-	-	-	-	I
H-TH	Eua	2,5	3,5	4,5	*Cichorium intybus*	+	+	+	+	+	V
H	Eua(M)	3	0	4	*Dactylis glomerata*	-	-	-	+	-	I
TH-H	Eua(M)	2,5	3	0	*Daucus carota*	+	+	-	+	+	IV
G	Cp(bor)	5	2	0	*Equisetum palustre*	+	-	-	-	-	I
H	Eua	3,5	0	0	*Festuca pratensis*	-	-	+	-	-	I
H	Eua	3	0	0	*Leontodon autumnalis*	+	-	-	-	-	I
H	Eua	2,5	0	0	*Lotus corniculatus*						
TH-H	Eua	3	4	4	*Pastinaca sativa*	+	+	+	+	+	V
H	Eua(M)	3,5	0	0	*Phleum pratense*	+	-	-	-	-	I
H	Eua	0	0	0	*Plantago lanceolata*	-	-	-	+	-	I
H	Eua	2,5	3	3	*Senecio jacobea*	+	-	-	-	-	I
H	Eua	3	0	3	*Vicia cracca*	+	-	-	-	-	I
					Plantaginetea						
Th	Eua(cont)	2,5	0	0	*Crepis tectorum*	+	-	-	-	-	I
H	Eua(M)	2,5	4	4,5	*Lolium perenne*	+	-	+	+	+	IV
Th-TH	Eua	2,5	3	4	*Medicago lupulina*	-	-	-	-	+	I
H-TH	Eua	3	0	0	*Trifolium pratense*	-	-	+	-	+	II
H	Eua	3,5	0	0	*Trifolium repens*	-	+	-	-	+	II
					Bidentetea						
H	Eua	4,5	3	0	*Epilobium tetragonum*	+	-	-	-	-	I
H(G)	Eua(M)	4,5	3	0	*Mentha longifolia*	-	-	-	-	+	I
H	Eua	4	0	0	*Ranunculus repens*	-	-	+	+	-	II

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					Variae syntaxa						
Phm	Adv	3	4	0	*Amorpha fruticosa*	-	-	-	+	-	I
H-G	Ec(M)	2,5	3,5	5	*Aristolochia clematitis*	-	-	-	-	+	I
Th	Eua	2,5	3	3	*Bilderdykia convolvulus*	+	+	+	-	-	III
Th	Eua(M)	1,5	3,5	4	*Bromus japonicus*	-	-	-	-	+	I
Th	Cosm	3	4	0	*Centaurea cyanus*	-	-	-	-	+	I
Th-TH	Adv	2,5	0	0	*Conyza canadensis*	-	-	+	-	-	I
H	E	0	3,5	0	*Epilobium lamyi*	-	+	+	-	-	II
Th	Adv	4	0	4	*Erigeron annuus*	+	-	-	+	-	II
H	Eua	2,5	2,5	3	*Galium album*	+	-	-	+	+	III
H	Adv	4	3	4	*Helianthus tuberosus*	-	-	-	1	+	II
H	Eua	3	3	0	*Hypericum perforatum*	-	-	-	-	+	I
H(G)	Eua(M)	2	4	4	*Lathyrus tuberosus*	+	-	-	-	+	II
H-Hh	Eua	5	3	0	*Myosotis scorpioides*	-	-	-	+	-	I
H	Eua	3	0	0	*Plantago major*	-	-	+	-	+	II
H	E	1,5	3	0	*Poa compresa*	+	+	+	-	-	III
G-Hh	Cosm	6	3	0	*Polygonum amphibium*	1	+	+	-	-	III
Th	Eua	2,5	3	3	*Polygonum convolvulus*	+	+	+	-	-	III
Phm	Eua	2	3	3	*Prunus spinosa*	-	-	+	-	-	I
H	Eua(M)	4,5	3	4	*Rubus caesius*	-	-	-	-	+	I
H	Eua	4	3	0	*Rumex crispus*	-	-	+	-	-	I
H	Eua	4	3	0	*Symphytum officinale*	+	+	-	+	-	III
H	Eua(M)	3,5	3	4	*Trifolium hybridum* ssp. *elegans*	-	-	-	-	+	I
Th	Eua(M)	1	3,5	2	*Vulpia myuros*	-	-	+	-	-	I

The spectrum of the bioforms: H-58,73%, Th-22,22%, G-7,93%, TH.7,93%, Phm-3.17%.
The spectrum of the geoelements: Eua-73,01%; Adv-9,52%, Cosm-6,34%, E-3,17%, Cp-3,17%, Ec-1,58%.
Location of the annotations: On the bprder of the cultivated fields in Mogoşeşti.

The community **Tanaceto-Arthemisietum vulgaris** Br.-Bl. 1949 covers the border areas near the cultivated fields in the Baia-Mare Depression. Since the soil in these areas is more broken up and richer in nutritive substances, the number of species which make up this community is higher than the preceding one, that is 64. Out of these 5 have K=V, and *Tanacetum vulgare* has the largest coverage, 13 species have K=III-IV, offering a high degree of coverage, both general and specific, whereas the other 46 species have K=I-II. The adventive species *Amorpha fruticosa* can only be found in this community in one annotation, but it seems to be much more widly spread in the area.

As far as bio-forms are concerned, it is interesting to observe the small number of categories (5) compared to other communities in the area.

Just like with the other communities in the Baia-Mare Depression, the main geo-element is represented by the Euro-Asian one, the European and Central European species are scarce, whereas the endimic ones are absent.

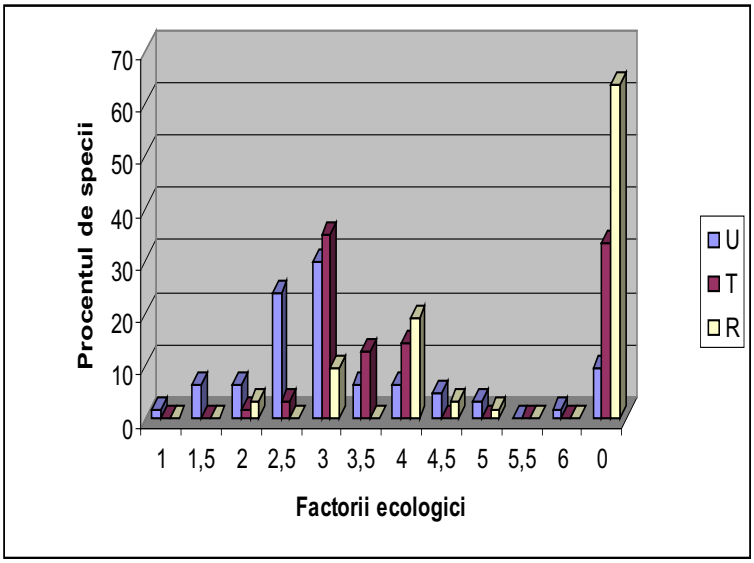

Fig. 1. The spectrum of the ecological factors in the community Tanaceto-Artemisietum vulgaris.

The needs for temperature vary within the general characteristic of the depression, with two maximum points (in the mesophyll and the indifferent), which does not make this community different from other plant communities in the area.

As far as temperature is concerned, most species side with the mesothermophilous, but with a slight tendency towards the moderate thermophilous, taking into consideration the moist and warm climate in the Baia-Mare Depression. The species that are indifferent can as normal be found in a larger number.

The reaction of the soil differenciates this community through the fact that the percentage of the indifferent species (63,49%) is higher than with other similar communities, which can be explained through the fact that Tanaceto-Artemisietum vulgaris grow at the border of a cultivated field which has undergone variations regarding the amending of the soil acidity.

Cls. Querco-Fagetea Br.-Bl. et Vliager1937.
Ord. Fagetalia sylvaticae (Pawl. 1928) Tx. et Diem. 1936
Al. Fagion medioeuropaeum Soó (1960) 1962
As. Querco robori-Carpinetum Soó et Pócs (1931) 1959.

Chart 2. The community Querco robori-Carpinetum.

					Nr. of annotation	1	2	3	4	5	K
					Altitude	155	155	155	160	155	
					Exposure	-	NV	NV	-	-	
					Slope	-	10°	10°	-	-	
					Coverage (%)	80	100	80	95	95	
Bioforma	Geoelem.	U	T	R	Surface (m²)	400	400	400	400	400	
					Char. Ass.						
PhM-Phm	E	3	3	3	*Carpinus betulus*	+	1	1	2	1	V
G	Cosm	3	3	0	*Quercus robur*	5	5	4	3	5	V
					Carpinion						
Phm	E	3,5	3	4	*Malus sylvestris*	-	-	-	+	-	I
PhM	E	3	3	3	*Tilia cordata*	-	-	-	-	2	I
H	Eua	3,5	3	0	*Symphytum tuberosum ssp. nodosum*	-	+	-	-	-	I
					Querco-Fagetea						
H(G)	Eua	3,5	3	3	*Aegopodium podagraria*	-	-	-	-	+	I
G	E	3,5	4	0	*Anemone nemorosa*	+	+	+	+	+	V
Phm-PhM	E	3	3	3	*Cerasus avium*	+	+	+	-	-	III
G	E(bor)	2,5	3	3	*Convallaria majalis*	-	-	+	-	-	I
Phm	Ec	3	3	4	*Cornus sanguinea*	-	+	+	-	-	II
Phm	E	3	3	3	*Corylus avellana*	+	+	+	-	-	III
Phm	E	2,5	3	3	*Crataegus monogyna*	+	+	+	+	+	V
Phm	E	2,5	3	4,5	*Crataegus rhipidophylla var. rhipidophylla*	-	-	-	-	+	I
H	Eua	3	2	2	*Cruciata glabra*	-	-	+	-	+	II
Phm	E	3	3	3	*Evonymus europaeus*	+	-	+	-	+	III
H	Eua	3	2,5	0	*Fragaria vesca*	+	+	-	+	+	IV
Phm	Eua	4	3	3	*Frangula alnus*	+	+	-	+	-	III
H	Eua	3	0	3	*Hieracium murorum*	+	-	-	-	-	I
Phm	E(M)	2,5	3	3	*Ligustrum vulgare*	-	+	+	+	+	IV
Th	E(cont)	3	3	3,5	*Melampyrum nemorosum*	+	-	-	+	-	II
Th-TH	Eua(M)	2,5	3	3	*Moehringia trinervia*	-	-	+	-	-	I
H	Eua	3	3	0	*Poa nemoralis*	-	-	+	-	+	II
G	E(bor)	3	3	3	*Polygonatum multiflorum*	+	-	-	-	+	II
PhM-Phm	Eua	3	2	2	*Populus tremula*	+	-	-	-	1	II
Phm	Eua	2	3	3	*Pteridium aquilinum*	+	+	+	-	+	IV
Phn	E	3	2,5	3	*Rubus hirtus*	-	+	-	-	-	I
H	Eua	3,5	3	0	*Scrophularia nodosa*	+	+	-	+	+	IV
H	Eua(M)	2,5	2	3	*Stellaria holostea*	+	+	+	-	-	III
G	Eua(cont)	2	0	4	*Veratrum nigrum*	-	-	+	+	-	II
PhM	Eua	3	3	4	*Ulmus minor*	+	-	-	-	-	I
H	Eua	3	3	3,5	*Viola reichembachiana*	-	+	-	-	-	I

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					Fagetalia						
H-Ch	E	3,5	0	0	*Ajuga reptans*	-	-	+	+	+	III
H	Cosm	4	2,5	0	*Athyrium filix-femina*	-	+	-	+	+	III
G	Ec	3	3	4	*Cardamine bulbifera*	-	+	-	+	+	III
H-G	Ec	3,5	3	2	*Carex brizoides*	-	1	1	1	1	IV
H	Cosm	4	3	0	*Dryopteris filix-mas*	+	+	+	+	-	IV
H	Eua	4	3	2,5	*Festuca gigantea*	-	+	-	-	-	I
H	E(M)	2,5	3	3	*Festuca heterophylla*	+	-	-	-	-	I
Th	Eua	4	3	4	*Impatiens noli-tangere*	+	-	-	-	-	I
H	Eua	2,5	2	0	*Luzula pilosa*	-	+	-	-	-	I
H	Cp(bor)	3,5	3	3	*Milium effusum*	-	+	-	-	+	II
H	Eua(M)	4,5	3	4	*Rubus caesius*	-	+	+	+	-	III
Phn	Cp(bor)	3	3	3	*Rubus idaeus*	-	+	-	+	-	II
H	E	4	3	4	*Rumex sanguineus*	-	-	+	-	-	I
H	Eua	3,5	0	0	*Stachys sylvatica*	+	-	-	-	-	I
					Quercetea pubescenti-petraeae						
Phm-PhM	E(cont)	2,5	3,5	4	*Acer tataricum*	-	+	+	-	+	III
Phn	Ec	2,5	3	0	*Cytisus nigricans*	+	-	-	-	-	I
Ch-Phn	Eua	2,5	3	2	*Genista tinctoria*	+	-	-	-	-	I
H	Pan-Carp	2,5	3	3	*Galium abaujense*	+	-	-	-	-	I
G	Eua(M)	2	3	4	*Polygonatum odoratum*	-	+	-	-	+	II
H	E(M)	2	4	4	*Vincetoxicum hirundinaria*	+	+	+	-	+	IV
					Variae syntaxa						
Br	E	-	-	-	*Brachytecium salebrosum*	-	+	-	-	-	I
TH	E	3	2,5	3	*Campanula patula* ssp. *patula*	-	-	-	+	-	I
H	Cosm	4	0	0	*Deschampsia caespitosa*	-	-	-	+	-	I
H	Cp(bor)	3,5	0	0	*Dryopteris dilatata*	+	+	+	+	-	IV
Th	Eua	3	3	0	*Galeopsis tetrahit*	-	-	+	-	-	I
H	Eua	3	3	0	*Hypericum perforatum*	-	-	-	+	-	I
H	Eua	3	4	0	*Lychnis viscaria*	-	-	+	-	-	I
H-Hh	Eua	5	0	0	*Lysimachia vulgaris*	-	+	-	-	+	II
H	Ec(M)	2,5	3	5	*Melittis melissophyllum*	-	+	-	-	-	I
Brchc	Cp	-	-	-	*Mnium cuspidatum*	-	-	+	-	-	I
Brchc	Cp	-	-	-	*Polytrichum commune*	-	+	+	+	+	IV
PhM-Phm	Eua	3,5	3	3	*Populus alba*	+	-	-	-	-	I
H	Eua(M)	0	0	0	*Potentilla erecta*	+	-	-	+	-	II
Phm-PhM	E	3	3	3	*Prunus spinosa*	+	-	-	+	-	II
H-Ch	Eua	3	3	0	*Stellaria graminea*	+	-	-	-	-	I
Phn	Ec	3,5	3	2,5	*Rubus sulcatus*	-	+	-	-	-	I
H	E	3,5	3	3	*Stellaria nemorum*	+	-	-	-	-	I
H-Ch	Eua	3	0	0	*Veronica chamaedrys*	-	-	+	-	+	II
Phm	Cp(bor)	4	3	4	*Viburnum opulus*	+	+	-	+	+	IV
H	Eua	2,5	3	2	*Viola canina*	+	-	-	-	-	I

The spectrum of the bioforms: H-46,47%, Phm-18,30%, G-9,85%, PhM-7,04%, Th-5,63%, Phn-5,63%, Brchc-2,81%, TH-1,40%, Ch-1,40%, Br-1,40%.
The spectrum of the geoelements: Eua-43,66%, E-32,39%, Ec-8,45%, Cp-8,45%, Cosm-5,63%, Pan-Carp-1,40%.
Location of the annotations: The oak-tree forest Două Veverițe (Lăpuşel).

The **Querco robori-Carpinetum** Soó et Pócs (1931) 1959 community can be found in the oak-tree forests in Baia-Mare where other mixed species also occur. The *Quercus robur* forest from the Baia-Mare Depression exists under two aspects, namely:

- In the lower and thus more humid areas (about 60% of the surface) one can maily find the community Carici brizoides-Quercetum roboris Rațiu *et al*. 1977, described in the area by Mititelu and Dorca in 1980.
- The higher and consequently less humid areas are covered by the community Querco robori-Carpinetum, which appear as alternating with Carici brizoides-Quercetum roboris.

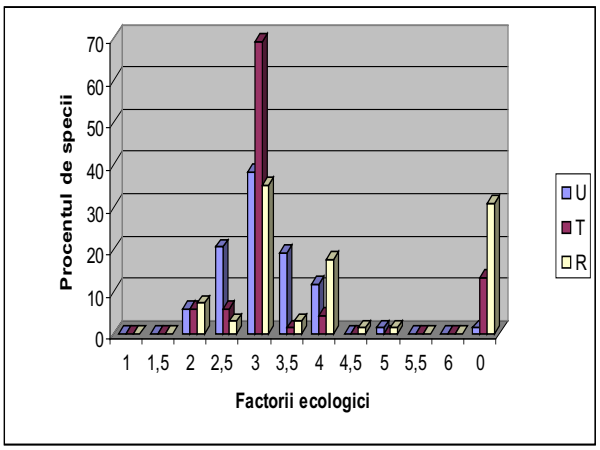

Fig. 2. The spectrum of the ecological factors in the Querco robori-Carpinetum community

Querco robori-Carpinetum presents itself as a well-defined community, with a number of 71 species, which is something normal for a forest community. There are 4 species with K=V, namely: *Anemone nemorosa, Carpinus betulus, Crataegus monogyna* şi *Quercus robur*. Four of the species have K=III-IV, which gives a certain stability to the community. The community presents itself under the form of a forest region with the soil uncovered, which contrasts from this point of view with the Carici brizoides-Quercetum roboris community where the soil is heavily covered by *Carex brizoides*.

In the Querco robori-Carpinetum community most species are hemicryptophyte, with a low coverage, as they do not grow very tall and mainly because within this community the largest part of the soil is either bare or covered only by leafage. The small number of mega-phanerophytes shows that the forest is stable.

The demands for moisture in the Salicetum triandrae community can be considered to be within the ordinary limits for the Baia-Mare Depression, that is most (69,22%) range between U_3 şi U_4.

Just like all over the Baia-Mare Depression when considering the geo-element, most species are of a Euro-Asian origin, followed by the European ones. The endemic speciaes are poorly represented.

As far as moisture is concerned, as normal, most species range somewhere in the middle of the spectrum, that is 89,70% of the species range between $U_{2,5}$ şi $U_{4.}$ The indifferent species hold a negligible share.

As for the factor T, the distributiopn of the plants is more interesting, 69,11% being grouped under the value T_3, whereas the rest of the values, the indifferent species included, being poorly represented. Of course, it is but normal that most species be grouped in the middle of the spectrum, bu ther is no explanatiion for the small number of the micro-mesotherme and moderate thermophilic plants.

The distribution of the plants according to factor R is also interesting, not so much in what $R_{0,}$ which accumulates 30.88% is concerned, but mainly due to the massive and abrupt drop in the number of the species corresponding to value $R_{3,5}$ compared to R_3 şi R_4.

It is interesting to observe in the community Querco robori-Carpinetum the presence of the species *Gagea spathacea* (Hayne) Salisb. var. *transcarpatica*,which is very rare, and which vegetates in March-April.

In the Baia-Mare Depression we have also identified as new the community Potamogetum natansis Soó 1927 in the artificial pond from Mogosesti. The community was identified opposite the locality Mogosesti, on the right-hand bank of the river Somes, in a pond that resulted from the excavation carried out on the first terrace. Actually, only idle fragments can be identified from this community, spread along the various branches of the pond. Due to the small and interrupted expanse of the pond, the community can be considered only a developing one, mainly since the area it grows on is a new one that was artificially created. It is a water community which makes good use of the moisture and temperature potential in the area.

CONCLUSIONS

In the community Tanaceto-Arthemisietum vulgaris, Br.-Bl. 1949 *Amorpha fruticosa* represents the main invasive adventive element.

In the community Tanaceto-Arthemisietum vulgaris, most species are Euro-Asian hemicryptophytes, mesophyll, mesotherme and indifferent to the reaction of the soil.

In the community Querco robori-Carpinetum Soó et Pócs (1931) 1959 most species are, Euro-Asian hemicryptophytes, mesophyll, mesotherme and acid-neutrophilous.

The community Querco robori-Carpinetum represents the vegetation of the high areas from the oak-tree forests in the Baia-Mare Depression.

In the Baia Mare Depression against the warm and moist climate there begin to grow new communities which would normally be found in the regions farther south of the country, such as the community Potamogetum natansis Soó 1927.

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