

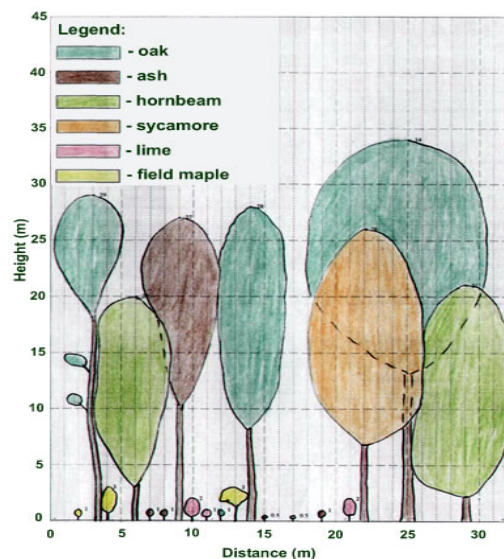
THE ASSOCIATION *FRAXINO ANGUSTIFOLIAE-QUERCETUM PEDUNCULIFLORAE* CHIFU ET AL. 1998, FROM THE RIVER SUCEAVA BASIN

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Summary: As a result of the researches carried out in 2003 in the river Suceava basin (the forests in the area of Pătrăuți), we identified phytocoenoses of the association *Fraxino angustifoliae-Quercetum pedunculiflorae* Chifu et al. 1998. An analysis of their structure and composition made evident the trees relatively even-aged character and various composition, all the layers (arborescent, shrubs, herbaceous) being well represented. The spectre of the bioforms is numerically outshone by hemicryptophytes but dominated by the phanerophytes when it comes to the biomass. Phytogeographically, the European elements are definitely prevalent. The value of the overground phytomass of the trees (obtained after surveys on spot) highlight the dominance of the biomass of the stems, followed by that of the branches.

Key words: even-aged, abundance-dominance, phanerophytes, hemicryptophytes, Euroasian elements, overground phytomass.

Phytocoenoses of this association have been identified and described by T. Chifu et al. in the valley of the river Prut (8), the natural reservation of Medeleni and then in the plateau of Bârlad (9).



Graph. 1 Vertical profile

In 2003, as a result of the researches made in the river Suceava basin, we identified this association in the forest near Pătrăuți. The unity of relief is represented by the plateau of Suceava, having as subunity the plateau of Dragomirna, with an average attitude of 450 m.

The phytocoenoses of this association occupy flat plots of land, at an altitude of 350 m. The arborescent layer covers 80-90% of the surfaces and is made up of *Quercus pedunculiflora* și *Fraxinus angustifolia* (illustrative species), *Carpinus betulus*, *Fraxinus excelsior*, *Quercus robur*, *Tilia cordata*, *Acer pseudoplatanus*, *Ulmus glabra*, *Cerasus avium*, *Acer platanoides* and *Fagus sylvatica*. This layer is ranged in tiers according to the different species and ages of the crowns; thus there are

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dominant trees, codominant trees and dominated (subdominant trees) (graph. 1).

The layer of bushes and shrubs is not very well represented, covering 10% of the surface or less. When it is the case, the shrubs are represented by the following species: *Corylus avellana*, *Crataegus monogyna*, *Acer campestre*, *Evonymus europaeus*, *Ligustrum vulgare* și *Rubus hirtus*. The regenerative layer is not very well represented either, especially by plantlets or sapling of the main species.

The herbaceous layer covers from 50 % to 90 %, due to the degree of opening of the crowning (table I).

Table I
As. Fraxino angustifoliae-Quercetum pedunculiflorae Chifu et al. 1998

No. of survey	1	2	3	4	5	K
Altitude (m.s.m.)	350	350	350	350	350	
Exposition	-	-	-	-	-	
Angle of slope (degrees)	0	0	0	0	0	
Covering – the layer (%)	80	90	90	80	90	
Covering – shrubs + sapling (%)	10	10	0	0	0	
Covering – herbaceous layer (%)	60	70	30	90	90	
Surface (m ²)	1000	1000	1000	1000	1000	
No. of species	60	44	39	34	54	
Ass. charact.						
<i>Fraxinus angustifolia</i>	+	+	-	+	-	III
Alnion incanae						
<i>Aegopodium podagraria</i>	1	1	1	1	2	V
<i>Geranium phaeum</i>	+	+	+	+	+	V
<i>Stachys sylvatica</i>	1	1	+	+	+	V
<i>Circaea lutetiana</i>	+	+	+	+	+	V
<i>Ulmus minor</i>	+	+	+	-	+	IV
<i>Ulmus glabra</i>	+	-	-	-	+	II
<i>Urtica dioica</i>	+	+	-	+	-	III
<i>Viburnum opulus</i>	+	-	+	-	-	II
<i>Rumex sanguineus</i>	+	+	-	-	-	II
<i>Impatiens noli-tangere</i>	-	+	-	+	-	II
<i>Alliaria petiolata</i>	-	-	-	+	+	II
<i>Stellaria nemorum</i>	-	-	-	+	+	II
Galio schultesii-Carpinenion						
<i>Carpinus betulus</i>	1	1	1	1	1	V
<i>Tilia cordata</i>	+	+	-	-	+	III
<i>Stellaria holostea</i>	+	+	+	+	1	V
<i>Galium schultesii</i>	+	-	+	-	-	II
<i>Cerasus avium</i>	+	-	+	+	+	IV
<i>Carex pilosa</i>	+	-	-	-	+	II
<i>Dactylis polygama</i>	+	+	-	-	+	III
<i>Ranunculus cassubicus</i>	-	-	-	-	+	I
<i>Campanula trachelium</i>	+	-	-	-	-	I
Symphyto-Fagion						
<i>Lathyrus venetus</i>	+	+	+	-	+	IV
<i>Acer pseudoplatanus</i>	+	+	-	-	1	III
Fagetalia						
<i>Acer platanoides</i>	+	+	1	+	+	V
<i>Asarum europaeum</i>	1	1	1	-	1	IV
<i>Euphorbia amygdaloides</i>	+	+	+	-	+	IV
<i>Paris quadrifolia</i>	+	+	+	-	+	IV
<i>Galium odoratum</i>	1	-	+	-	1	III
<i>Fagus sylvatica</i>	+	-	+	-	-	II
<i>Rubus hirtus</i>	+	+	-	-	-	II

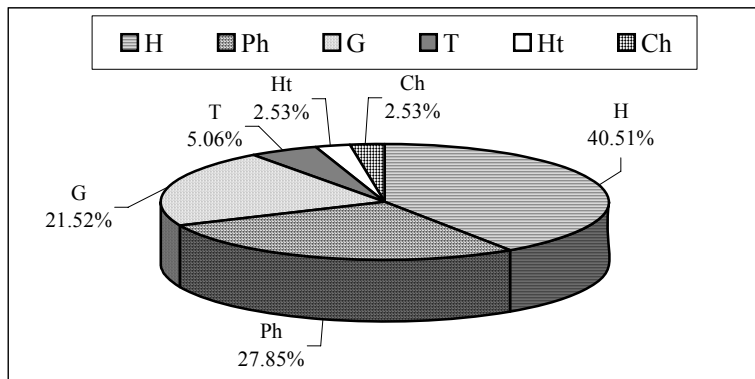
<i>Salvia glutinosa</i>	+	-	-	+	+	III
<i>Lamium galeobdolon</i>	+	-	+	-	+	III
<i>Milium effusum</i>	+	+	-	-	+	III
<i>Hordelymus europaeus</i>	+	-	-	-	+	II
<i>Mercurialis perennis</i>	+	-	+	1	2	IV
No. of survey	1	2	3	4	5	K
<i>Daphne mezereum</i>	-	-	-	-	+	I
<i>Lathyrus vernus</i>	+	+	-	-	-	II
<i>Carex sylvatica</i>	+	+	-	-	+	III
<i>Aposeris foetida</i>	-	+	-	-	+	II
<i>Anemone nemorosa</i>	-	-	-	-	+	I
<i>Dryopteris carthusiana</i>	+	-	-	-	-	I
<i>Maianthemum bifolium</i>	-	-	-	-	+	I
Querceto-Fagetea						
<i>Quercus robur</i>	2	2	1	2	2	V
<i>Corylus avellana</i>	2	+	-	-	-	II
<i>Crataegus monogyna</i>	+	+	+	+	+	V
<i>Fraxinus excelsior</i>	+	+	+	1	+	V
<i>Glechoma hirsuta</i>	+	1	1	1	1	V
<i>Dryopteris filix-mas</i>	+	+	+	+	+	V
<i>Dentaria bulbifera</i>	+	-	+	+	-	III
<i>Pulmonaria obscura</i>	1	1	+	-	1	IV
<i>Brachypodium sylvaticum</i>	+	-	-	-	-	I
<i>Athyrium filix-femina</i>	+	+	-	-	-	II
<i>Hepatica nobilis</i>	+	-	+	-	+	III
<i>Acer campestre</i>	+	+	+	+	+	V
<i>Evonymus europaeus</i>	+	+	+	-	+	IV
<i>Geum urbanum</i>	+	-	+	+	+	IV
<i>Polygonatum latifolium</i>	+	+	+	+	+	V
<i>Carex praecox</i>	+	+	-	-	-	II
<i>Pulmonaria officinalis</i>	+	+	-	-	+	III
<i>Ranunculus auricomus</i>	+	-	+	-	+	III
<i>Scrophularia nodosa</i>	+	-	-	-	-	I
<i>Fragaria vesca</i>	+	+	-	-	-	II
<i>Ajuga reptans</i>	+	+	-	+	+	IV
<i>Viola reichenbachiana</i>	-	-	+	-	+	II
<i>Neottia nidus-avis</i>	-	-	+	-	-	I
<i>Convallaria majalis</i>	-	-	-	+	-	I
<i>Geranium robertianum</i>	-	-	-	-	+	I
Quercetea pubescentis						
<i>Quercus pedunculiflora</i>	+	+	+	+	+	V
<i>Polygonatum odoratum</i>	+	-	+	+	-	III
<i>Viburnum lantana</i>	+	-	-	+	+	III
<i>Ligustrum vulgare</i>	-	+	-	-	+	II
<i>Prunus spinosa</i>	-	+	-	+	-	II
<i>Vinca minor</i>	-	+	-	+	-	II
<i>Arum orientale</i>	-	-	+	+	+	III
Companions						
<i>Galeopsis tetrahit</i>	+	+	-	-	-	II
<i>Galeopsis speciosa</i>	-	-	+	-	+	II
<i>Anthriscus sylvestris</i>	-	-	+	+	+	III
<i>Silene dioica</i>	-	-	-	+	-	I

Localization and date of surveys: 1 – Pătrăuți, near the natural reservation Quercetum (7.08.2003); 2-5 - Pătrăuți, near the natural reservation Quercetum (15.08.2003);

In all the five surveys we identified 79 species, with an average of 46 species per survey. Survey 1 has the greatest number of species (60 species), and survey 4 is at the

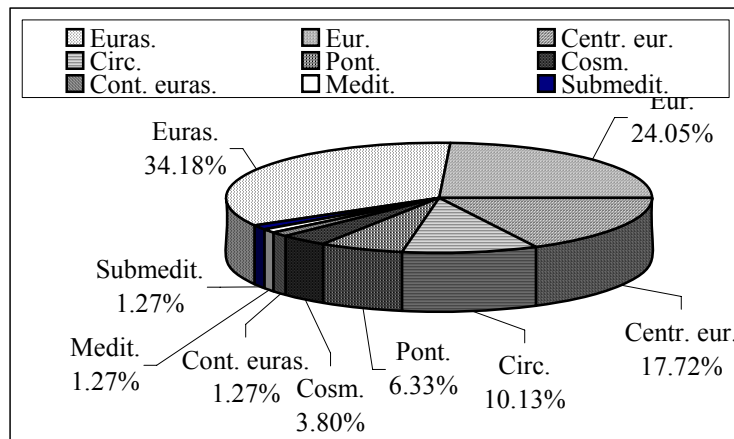
opposite pole, with 34 species (here, however, the herbaceous layer is richer than the first).

The spectre of the bioforms (graph 2) is numerically dominated by the hemicryptophyte species (40.51 %), followed by the phanerophyte species (27,85 %). Geophyte species (21,52 %) are represented by numerous vernal and estival species.



Graph. 2. The spectre of the bioforms of the association *Fraxino angustifoliae-Quercetum pedunculiflorae* Chifu et al. 1998

One can notice in the analysis of the distribution of the floristic elements (graph. 3) the dominance of the elements with a northern character: the Euroasian elements (34.18 %), the European elements (24.05 %) and the Central-European elements (17.72 %), resulting 75.95 % of the total of species. Relatively well represented as follows: the circumpolar elements (10.13 %) and the pontic elements (6.33 %).

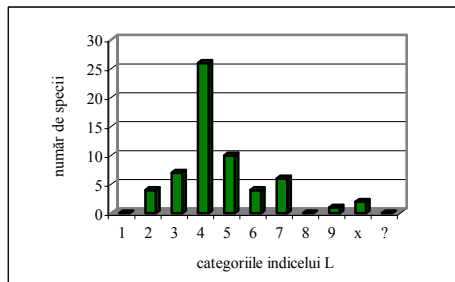


Graph. 3. The spectre of the floristic elements of the *Fraxino angustifoliae-Quercetum pedunculiflorae* Chifu et al. 1998

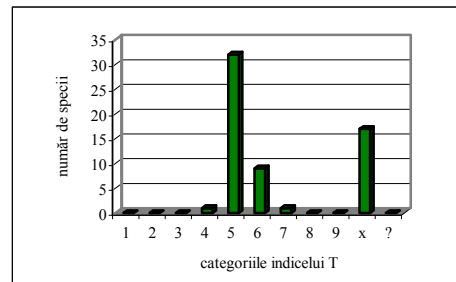
The analysis of the distribution of species according to the six ecological indexes (H. Ellenberg - L, T, K, F, R, N) (14), emphasized general features of the spectre of the vegetal species from the surveys under study, as well as different ecological land corrological characteristics of the entire association, irrelated with the preferences of the species for different factors. All these finally express the ecological characteristics of the

stations where the phytocoenoses under study develop. Thus, we can draw the following conclusions:

- as far as the analysis of the preferences of the species for the light (graph. 4), the best represented is the intermediary category between the semiombrophile species and the sciaphile species;



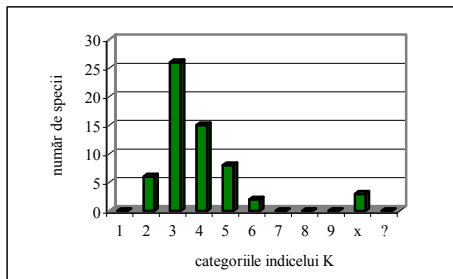
Graph. 4. Distribution of the species in relation to light (L)



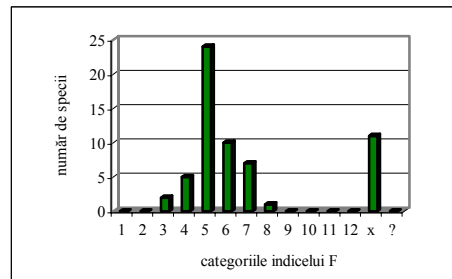
Graph. 5. Distribution of the species in relation to temperature (T)

- as for the preferences for temperature (graph. 5), the greatest proportion belongs to the mezothermic species (category 5), followed by the eurithermic species (category x);

- as far as the continentalism of the species is concerned (graph. 6), the greatest proportion belongs to the intermediary category between the species preferring the oceanic climate and those from suboceanic areas (category 3), as well as the species from areas with suboceanic climate (category 4);



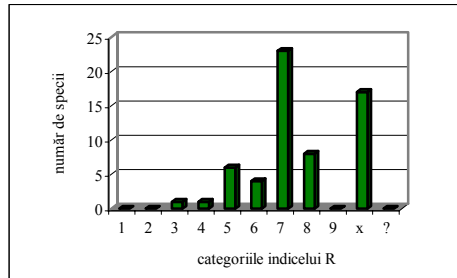
Graph. 6. Distribution of species in relation to continentality (K)



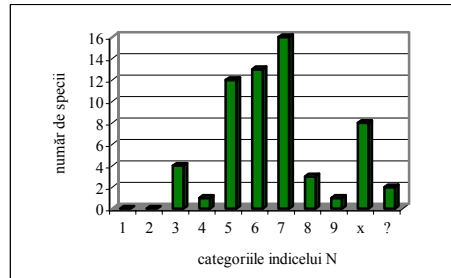
Graph. 7. Distribution of the species in relation to moisture content (F)

- regarding the moisture content (graph. 7), the greatest proportion belongs to the category of mezoxerophile species, followed by the category of euriphytes (amphitolerant);

- from the distribution of the species according to their reaction to the soil (graph. 8), we deduce that the majority is made up of neutrophile species (category 7), followed by the euriacide species;



Graph. 8. Distribution of species in relation to their reaction of the soil (R)



Graph. 9. Distribution of the species in relation to the amount of nitrogen available in the soil (N)

- regarding the distribution of the species in relation to the amount of nitrogen available in the soil (graph 9), the category of the nitrophile species (category 7) has the greatest proportion, followed by the mezonitrophile species and the intermediary between the two;

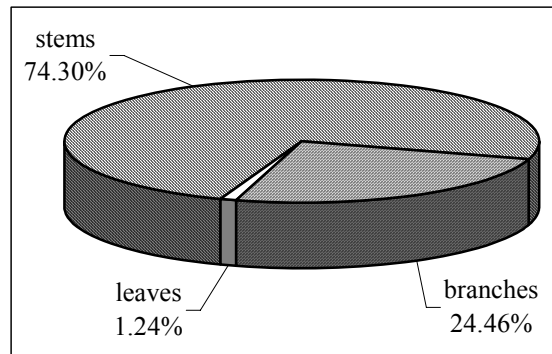
The phytomass was calculated according to the data gathered on spot, in order to establish diameters and densities (table II). Initially it was calculated for the representative average phytoindividual for the species and the total phytomass was obtained according to the density of the trees. For this association, in the phytocoenosis under study (that is in the area of Pătrăuți) we got a final overground phytomass of 503.7 t/ha for the arorescent layer.

Table II

Indexes of phytomass in a phytocoenosis of the association
Fraxino angustifoliae-Quercetum pedunculiflorae Chifu et al. 1998

Species	Stage	Average diameter (cm)	Density (arb./ha)	Phytomass (kg)				Total phytomass (kg/ha)			
				stems	branches	leaves	total	stems	branches	leaves	total
oak	young high forest	32.69	124	444.8	143.5	8.2	596.5	55160.9	17789.6	1010.8	73961.4
	high forest	49.34	176	1576.1	503.8	26.5	2106.5	277401.8	88670.3	4663.3	370735.4
ash	pole stage	19.27	20	158.9	56.7	2.6	218.2	3178.3	1133.5	52.6	4364.4
	young high forest	29.25	36	519.1	206.9	4.8	730.8	18687.6	7448.4	174.4	26310.4
	high forest	44.02	4	906.3	394.9	10.8	1312.0	3625.0	1579.8	43.3	5248.1
hornbeam	pole stage	20	12	188.9	85.5	3.1	277.5	2266.8	1026.0	37.2	3330.0
	young high forest	29.64	32	435.0	173.8	8.2	617.0	13920.3	5562.1	261.5	19743.8
total phytomass								374240.8	123209.6	6243.1	503693.5

This overground phytomass of the arborescent layer is made up of the phytomass of the stems (74.30 % - fig. 110), the phytomass of the branches (24.46 %) and the phytomass of the leaves (1.24 %).



Graph. 10. Spectre of phytomass – distribution of vegetative organs

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