

LATHYRO AUREI – FAGETUM (DOBRESCU ET KOVACS 1973) CHIFU 1995 ASSOCIATION FROM THE VASLUI RIVER BASIN

IRINA BLAJ*

Abstract: The study analyzes the *Lathyro aurei – Fagetum* (Dobrescu et Kovacs 1973) Chifu 1995 association both phytocoenologically and from the viewpoint of the aerial phytomass of the arborescent layer and herbaceous layer it develops. The forests gathered in this association achieve a density of 548 trees/ha, a phytomass of the arborescent layer of 308639.24 Kg/ha and the herbaceous layer of 82.30 kg desiccated substance/ha.

Key words: phytocoenology, vegetation of forests, aerial phytomass

Study of the forest vegetation was based on the phytosociological method of Braun-Blanquet [6], while calculation of the aerial phytomass of the arborescent and herbaceous layer made use of working procedures taken over from the recent literature of the field [2,5,10,11].

The *Lathyro aurei – Fagetum* (Dobrescu et Kovacs 1973) Chifu 1995 association is part of the *Aro orientalis – Carpinenion* (Dobrescu et Kovacs 1973) Täuber 1991-1992 suballiance, the *Lathyro hallersteinii – Carpinion* Boșcaiu 1974 alliance, *Fagetalia sylvaticae* Pawlowski in Pawlowski et al. 1928 order, *Quercu – Fagetea* Br.-Bl. et Vlieger in Vlieger 1937 class (Table 1)[1,3,7,8,12].

This association has been mentioned by C. Dobrescu and collab. (1964) under the name of associations with *Fagus sylvatica-Carpinus betulus-Tilia tomentosa* [4].

It grows at average altitudes of 300m, on north-east or north-west oriented weakly sloped soils.

The floristic composition is quite rich and varied, including more than 88 species which belong to the *Quercu – Fagetea* class.

Trees' layer represents an average cover of 80%, *Fagus sylvatica* dominating, besides *Fagus taurica*, *Carpinus betulus*, *Tilia tomentosa*.

The average density of the arborescent layer is of 548 trees/ha, *Carpinus betulus* being predominant with 260 trees/ha, followed by *Tilia tomentosa* – 108 trees/ha and *Fagus sylvatica* (*F. taurica*) – 100 trees/ha (Table 3). The average diameter attained is of 27.64cm, the phytocoenosis belonging to that of the small-wood stage (with diameter between 21-36 cm) (Table 4).

As to the total aerial phytomass realized by the woody species, it amounts to 308639.24 kg/ha, of which trunks' phytomass represents 74.38% (229584.56 kg/ha), branches' phytomass – 24.36% (75212.74 kg/ha) and, finally, leaves' phytomass – 1.26% (3841.93 kg/ha). The main part of phytomass is brought by the *Carpinus betulus* species with 169419.87 kg/ha, *Fagus sylvatica* (*F. taurica*) species, with 48416.08 kg/ha and *Tilia tomentosa* species, with 48133.44 kg/ha (Table 5).

The bushy layer is weakly represented, while the herbaceous one – with an average coverage of 30% - is frequently composed of the following species: *Galium*

* Faculty of Biology, "Al. I. Cuza" University of Jassy

odoratum, *Salvia glutinosa*, *Viola reichenbachiana*, *Brachypodium sylvaticum*, *Euphorbia amygdaloides* etc.

Aerial phytomass of the herbaceous layer has the amount of 82.30 kg desiccated substance/ha, of which, in the vernal season there was 60.40 kg desiccated substance/ha and in the aestival season there was 21.90 kg desiccated substance/ha (Table 2). The phytomass amount attained during the aestival season is quite low, due to unfavorable meteorological conditions represented by high temperatures and very low amounts of precipitations or even drought. The species with the most important contribution of desiccated substance during the vernal season is *Allium ursinum* ssp. *ucrainicum* and during the vernal season the herbaceous layer is almost inexistent.

Analysis of the bioforms: H-45.45%, Ph-29.55%, G-15.90%, T-4.55%, Ht-3.4%, Ch-1.15%.

Analysis of the phytogeographical elements: Eur.- 40.90%, Euras.-35.25%, Pont.-7.95%, Circ.-7.95%, Cosm.-3.4%, Adv.-3.4%, End. Carp.-1.15%.

Further on, analysis of the ecological indices points to the fact that the species forming the association's floristic composition are mesophyllic, mesothermal, mesohydrophylic, growing on neutral soils with a moderate content of mineral nitrogen.

Bibliography

1. CHIFU T. 1995 – Contributions à la syntaxonomie de la vegetation de la classe *Carpino – Fagetea* (Br.-Bl. et Vlieg. 1937) Jackus 1960 sur le territoire de la Moldavie (Roumanie). *An. Șt. ale Univ. "Al. I. Cuza" Iași, s. II a. (Biol. veget.)*, **41**: 61-66
2. CHIFU T., ȘTEFAN N. 1997 – Les hêtraies collinaires du nord-est de la Moldavie (Roumanie). *An. Șt. ale Univ. "Al. I. Cuza" Iași, s. II a. (Biol. veget.)*, **43**: 71-78
3. CHIFU T., ȘTEFAN N., SĂRBU I. 1996 – Contribuții la studiul vegetației din clasa *Carpino – Fagetea* (Br.-Bl. et Vlieg. 1937) Jackucs 1960 de pe teritoriul Moldovei (România). *Șt. și Cercet., Muz. Piatra-Neamț*, **8**: 295-326
4. CHIFU T., SĂRBU I., ȘTEFAN N., ȘURUBARU B. 1999 – Contribuții la fitocenologia fâgetelor colinare și a cărpinetelor din Podișul Central Moldovenesc. *Bul. Grăd. Bot. Iași*, **8**: 49-69
5. CHIFU T., ȘTEFAN N., HUȚANU MARIANA, COROI M., COROI ANA-MARIA 1997 – Biomasse et productivité annuelle aériennes de la strate arborescente des hêtraies collinaires du Plateau Centrale Moldave. *Șt. și Cerc. de Biol., Ser. Biol. veg.*, **49** (1-2): 43-56
6. CRISTEA V. 1993 – *Fitosociologie și vegetația României* (litografiat), Univ. "Babeș-Bolyai" Cluj-Napoca
7. DOBRESCU C. BARCA C., LAZAR Maria. 1964 – Contribuții floristice și geobotanice referitoare la masivul forestier Bârnova-Repedea, Iași (II). *An. Șt. ale Univ. "Al. I. Cuza" Iași, s. II a. (Biol.)*, **10** (2): 322-355
8. DOBRESCU C., KOVÁCS ATT. 1973 – Contribuții la fitocenologia pădurilor de "*Fagion*" din Podișul Central Moldovenesc. *Rev. Păd.*, **88** (11): 592-599
9. ELLENBERG H. 1974 – Indicator values of vascular plants in Central Europe. *Scripta Geobotanica*, **IX**, Verlag Erich Goltze K.G., Göttingen: 1-97
10. IVAN Doina, DONIȚĂ N. 1975 – *Metode practice pentru studiul ecologic și geografic al vegetației*. Centr. de multiplicare a Univ. București
11. KESTEMONT P. 1973 – Production primaire de la strate arborée d'un hêtraue à fêtuques, *Bulletin de la Société Royale de Botanique de Belgique*, **106**: 305-316
12. WALLNÖFER SUSANNE, MUCINA L., GRASS V. 1993 – Querco - Fagetea In: MUCINA L., GRABHERR G., WALLNÖFER SUSANNE - *Die pflanzenesellschaften Österreichs*, **III**: 85-236, Gustav Fischer Verlag Jena - Stuttgart - New York

Table 1. *Lathyro aurei* - *Fagetum* (Dobrescu et Kovacs 1973) Chifu 1995

Number of relevee	1	2	3	4	5	6	7	8	9	10	11	12	13	
Altitude (m)	340	350	340	250	300	200	200	180	300	380	380	300	380	
Exposition	E	NV	N	NE	NE	N	NE	E	V	NV	NV	NE	E	
Slopes degrees)	1	2	1	30	5	40	10	5	5	3	6	3	3	
Coverage of the arborescent layer (%)	90	85	80	75	80	80	80	90	90	85	80	80	75	
Coverage of the bushy and juvenile layer (%)	5	2	8	30	15	10	20	2	-	2	15	2	-	
Coverage of the herbaceous (%)	50	5	25	50	10	20	30	10	8	25	25	7	100	
Surface (m ²)							1000							
Number of species	46	17	27	24	22	21	28	23	21	20	23	22	8	K
Characteristic sp.														
<i>Fagus taurica</i>	+	-	-	-	-	-	+	-	-	-	-	+	-	II
<i>Aro orientalis-Carpinion</i>														
<i>Carpinus betulus</i>	2	4	3	3	3	+	4	3	+	1	2	+	3	V
<i>Carpinus betulus</i> juv.	-	+	+	2	+	+	1	-	-	-	+	-	-	III
<i>Tilia tomentosa</i>	1	+	+	1	+	1	1	3	1	+	+	+	+	V
<i>Tilia tomentosa</i> juv.	-	-	-	-	+	+	+	+	-	+	-	-	-	II
<i>Lathyrus venetus</i>	+	-	-	-	-	-	-	-	-	-	-	-	-	I
<i>Lathyro hallersteinii-Carpinion</i>														
<i>Cerasus avium</i>	-	-	+	+	+	+	+	-	-	-	-	-	-	II
<i>Cerasus avium</i> juv.	+	-	-	-	-	-	-	-	-	+	+	-	-	II
<i>Tilia cordata</i>	+	2	-	+	+	-	-	-	-	-	-	+	-	II
<i>Dentaria glandulosa</i>	+	-	-	-	-	-	-	-	-	-	-	-	-	I
<i>Lathyrus vernus</i>	+	-	-	-	-	-	-	-	-	-	-	-	-	I
<i>Campanula trachelium</i>	-	+	-	-	+	-	-	-	-	-	-	-	-	I
<i>Stellaria holostea</i>	-	-	-	-	-	-	-	-	-	-	-	+	-	I
<i>Tilio platyphyllae-Aceri pseudoplatani</i>														
<i>Acer platanoides</i>	-	-	+	1	-	+	+	+	+	+	+	-	-	III
<i>Acer platanoides</i> juv.	+	-	+	+	-	+	1	+	-	+	-	+	-	III
<i>Geranium robertianum</i>	+	-	+	+	-	-	+	-	-	-	-	-	-	II
<i>Acer pseudoplatanus</i>	-	-	-	-	-	+	+	-	-	-	-	-	-	I
<i>Acer pseudoplatanus</i> juv.	+	-	-	1	-	-	1	-	-	-	-	-	-	II
<i>Dryopteris filix-mas</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	I
<i>Symphyto cordati-Fagion</i>														
<i>Epipactis helleborine</i>	+	-	-	-	-	-	-	+	-	+	-	-	-	II
<i>Platanthera bifolia</i>	-	-	-	-	-	-	-	-	-	-	+	-	-	I
<i>Rubus hirtus</i>	+	-	-	-	-	-	+	-	-	-	-	-	-	I
<i>Dactylis glomerata</i>	+	-	+	-	-	-	-	-	-	-	-	-	-	I
<i>Alnion incanae</i>														
<i>Urtica dioica</i>	+	-	+	-	-	-	-	-	+	+	+	+	-	III
<i>Aegopodium podagraria</i>	3	-	1	-	+	-	-	-	-	-	-	-	-	II
<i>Geranium phaeum</i>	+	+	+	+	-	-	-	-	-	-	-	+	-	II
<i>Glechoma hederacea</i>	+	-	+	-	-	-	-	-	+	-	-	-	-	II
<i>Carex remota</i>	-	-	-	1	-	+	1	-	-	-	-	-	-	II
<i>Sambucus nigra</i>	-	+	-	-	-	-	-	-	-	-	-	+	-	I
<i>Pyrus piraster</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	I
<i>Lamium maculatum</i>	-	-	-	-	-	-	+	-	-	-	-	+	-	I
<i>Rubus caesius</i>	-	+	-	-	-	-	-	-	-	-	-	-	-	I
<i>Humulus lupulus</i>	-	+	-	-	-	-	-	-	-	-	-	+	-	I
<i>Physalis alkekengi</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	I
<i>Athyrium filix-femina</i>	-	-	+	-	-	-	-	-	-	-	-	-	-	I
<i>Alliaria petiolata</i>	-	-	-	-	-	-	-	-	1	-	-	-	-	I

Arctium nemorosum	-	-	-	-	-	-	-	-	-	-	-	-	+	-	I
Stellaria nemorum	-	-	-	-	-	-	-	-	-	-	-	+	-	-	I
Fagetalia															
Fagus sylvatica	2	1	1	1	2	3	1	1	4	4	3	4	1		V
Fagus sylvatica juv.	-	-	-	+	+	+	+	+	-	+	2	+	-		I V I V
Galium odoratum	+	-	+	1	+	1	+	-	-	+	+	+	+		V
Euphorbia amygdaloides	+	-	-	-	-	+	1	+	+	+	+	-	-		III
Salvia glutinosa	+	+	+	-	-	-	1	+	+	+	+	-	-		III
Asarum europaeum	+	-	+	1	-	+	1	-	-	-	-	-	-		II
Dentaria bulbifera	1	-	-	-	-	-	-	+	-	-	-	-	+		II
Lamium galeobdolon	+	-	+	+	-	-	-	-	-	-	-	-	-		II
Stachys sylvatica	-	+	-	+	-	-	-	-	+	-	+	-	-		II
Geranium phaeum	-	-	-	-	-	-	-	+	-	-	+	+	-		II
Carex sylvatica	+	-	-	-	-	-	-	+	-	-	-	-	-		I
Allium ursinum ssp. ucrainicum	+	-	-	-	-	-	-	-	-	-	-	-	5		I
Carex pilosa	+	-	-	-	-	-	-	-	-	-	-	-	-		I
Anemone nemorosa	+	-	-	-	-	-	-	-	-	-	-	-	+		I
Mercurialis perennis	1	-	-	-	-	-	-	-	-	-	-	-	-		I
Pulmonaria obscura	+	-	-	-	-	-	-	+	-	-	-	-	-		I
Sanicula europaea	-	-	+	-	+	-	-	-	-	-	-	-	-		I
Anemone ranunculoides	1	-	-	-	-	-	-	-	-	-	-	-	-		I
Pulmonaria officinalis	-	-	-	-	-	+	+	-	-	-	-	-	-		I
Scrophularia nodosa	+	-	-	-	-	-	-	-	-	-	-	-	-		I
Epilobium montanum	-	-	-	-	-	-	-	-	-	-	+	-	-		I
Chaerophyllum temulum	-	-	-	-	-	-	-	-	-	-	+	-	-		I
Campanula rapunculoides	-	-	-	-	-	-	-	-	+	-	-	-	-		I
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	+	-		I
Quercu-Fagetea															
Viola reichenbachiana	+	-	1	1	+	+	1	+	+	+	+	+	-		V
Hedera helix	-	+	-	1	+	1	+	-	-	+	-	-	-		III
Mycelis muralis	-	+	-	-	+	+	-	+	+	-	+	+	-		III
Brachypodium sylvaticum	+	-	+	-	+	-	-	+	+	+	+	-	-		III
Ulmus minor	+	-	+	-	-	-	-	-	-	-	-	-	+		II
Ulmus minor juv.	+	-	-	-	-	-	-	-	-	-	-	-	-		I
Acer campestre	+	+	+	-	+	-	-	-	-	+	-	-	-		II
Acer campestre juv.	-	-	+	-	+	+	-	-	-	-	-	-	-		II
Fraxinus excelsior	-	-	-	-	+	-	-	+	+	+	-	1	-		II
Fraxinus excelsior juv.	+	-	-	-	-	+	+	-	-	-	+	+	-		II
Melica uniflora	+	-	-	-	-	-	-	+	-	-	+	-	-		II
Quercus dalechampii	+	-	-	+	-	-	-	-	-	-	-	-	-		I
Quercus dalechampii juv.	-	-	-	+	-	-	-	-	-	-	-	-	-		I
Convallaria majalis	+	-	-	-	-	-	-	-	-	-	-	-	-		I
Evonymus europaeus	+	-	-	-	-	-	-	-	-	-	-	-	-		I
Populus tremula	+	-	-	-	-	-	-	-	-	-	-	-	-		I
Quercus robur	-	-	-	-	+	-	-	-	+	-	-	-	-		I
Quercus petraea	-	-	-	-	-	1	-	-	-	-	-	-	-		I
Quercus petraea juv.	-	-	-	-	-	-	+	-	-	-	-	-	-		I
Fragaria vesca	-	-	-	-	-	-	+	-	-	-	-	-	-		I
Moehringia trinervia	-	-	-	-	-	-	-	+	-	-	-	+	-		I

Rosa canina	-	-	-	-	-	-	-	+	-	-	-	-	-	I
Lathrea squamaria	-	-	-	-	-	-	-	+	-	-	-	-	-	I
Geum urbanum	-	-	-	-	-	-	-	-	+	+	-	-	-	I
Crataegus monogyna	-	-	-	-	-	-	-	-	+	-	-	-	-	I
Corylus avellana	-	-	-	-	-	-	-	-	-	+	-	-	-	I
Viola odorata	-	-	-	-	-	-	-	-	+	-	-	-	-	I
Poa nemoralis	-	-	-	-	-	-	-	-	-	+	-	-	-	I
<i>Quercetea pubescentis</i>														
Polygonatum odoratum	+	-	+	-	-	-	-	-	-	-	-	-	-	I
Cornus mas	-	+	-	-	+	-	+	-	-	-	-	-	-	I
Acer tataricum	-	-	-	+	-	-	-	-	-	-	-	-	-	I
Cruciata laevipes	-	-	-	-	-	-	-	-	-	-	+	-	-	I
Agrimonia eupatoria	-	+	-	-	-	-	-	-	-	-	-	-	-	I
<i>Variae syntaxa</i>														
Galium aparine	+	-	-	-	-	-	-	+	-	-	-	+	-	II
Polygonum convolvulus	-	-	-	-	-	-	-	-	+	-	-	-	-	I
Ajuga reptans	-	-	-	+	-	-	+	-	-	-	-	-	-	I
Lunaria rediviva	-	-	-	+	-	-	-	-	-	-	-	-	-	I
Veronica chamaedrys	-	-	-	-	-	-	+	-	-	-	-	-	-	I

Place and date of the relevés: 1,3. Poiana cu Cetate, 11.06.2003, 17.07.2002; 2,5. Poieni, 23.08.2003; 4,6,7,12. Bârnova, 27.08.2002; 8. pd. Rotarilor, 12.07.2002; 9. dl. Coloneasa, 24.08.2003; 10,11,13. dl. Perjului, 23.08.2003, 6.05.2002

Tabel 2. Phytomass (kg/ha) of the herbaceous forest layer

Species	Desiccated substance (%)	Aerial phytomass (kg/ha)	
		Green	Anhydrous
a. Vernal phytomass			
Aegopodium podagraria	11.66	60	7
Allium ursinum ssp. ucrainicum	10.4	250	26
Pulmonaria sp.	16	20	3.2
Stellaria holostea	12.5	32	4
Lamium maculatum	42.85	7	3
Corydalis sp.	12.5	40	5
Dentaria bulbifera	12.4	50	6.2
Lathyrus sp.	13.07	26	3.4
Diverse specii	18.57	14	2.6
Total a.	-	499	60.4
b. Aestival phytomass			
Salvia glutinosa	18.75	32	6
Galium odoratum	19.09	22	4.2
Viola reichenbachiana	22.5	8	1.8
Carex sp.	40	10	4
Asarum europaeum	14.61	13	1.9
Euphorbia amygdaloides	22.85	14	3.2
Sanicula europaea	18.18	4.4	0.8
Total b.	-	103.4	21.9
Total a. + b.	-	602.4	82.3

Tabel 3. Average density (trees/ha) of the arborescent layer

Diameter (cm)	<i>Tilia tomentosa</i>	<i>Carpinus betulus</i>	<i>Fagus sylvatica</i>	<i>Cerasus avium</i>	<i>Quercus dalechampii</i>	<i>Acer platanoides</i>	Total
11-20	16	52	60	-	4	8	140
21-36	88	172	40	20	36	12	368
> 36	4	36	-	-	-	-	40
Total	108	260	100	20	40	20	548

Tabel 4. Average diameter (cm) of the arborescent layer

Diameter (cm)	<i>Tilia tomentosa</i>	<i>Carpinus betulus</i>	<i>Fagus sylvatica</i>	<i>Cerasus avium</i>	<i>Quercus dalechampii</i>	<i>Acer platanoides</i>	Average of phytocoenosis
11-20	19.07	13.46	17.34	-	20.00	18.11	17.60
21-36	29.48	29.27	24.42	31.35	29.63	24.00	28.83
> 36	44.00	41.39	-	-	-	-	41.66
Average of phytocoenosis	28.88	29.37	20.47	31.35	28.81	21.83	27.64

Table 5. Phytomass (kg/ha) of the arborescent layer, according to species of the *Lathyro aurei-Fagetum* association

Species	Density (trees/ha)	Average diameter (cm)	Phytomass (kg/ha)								
			Trunks	Branches					Leaves	Total	
				Total	5	4	3	2			1
<i>Tilia tomentosa</i>	16	19.07	2439.99	832.44	-	47.89	264.68	486.40	33.47	38.27	3310.70
	88	29.48	29781.00	10136.00	-	2627.41	3944.82	3298.32	265.45	267.74	40184.74
	4	44.00	3469.20	1122.80	51.80	427.60	348.00	248.60	46.80	46.00	4638.00
Total	108	28.88	35690.19	12091.24	51.80	3102.90	4557.50	4033.32	345.72	352.01	48133.44
<i>Carpinus betulus</i>	52	13.46	4649.73	1922.34	-	-	798.52	1067.04	56.78	100.03	6672.10
	172	29.27	84116.44	29486.95	-	5822.54	11682.92	10350.61	1630.88	1356.09	114989.48
	36	41.39	36775.73	10396.69	609.36	3288.78	2987.76	2750.96	759.81	615.87	47788.29
Total	260	29.37	125541.90	41805.98	609.36	9111.32	15469.20	14168.63	2447.47	2071.99	169419.87
<i>Fagus sylvatica</i>	60	17.34	14999.10	4010.94	-	-	1538.49	1996.11	476.34	462.36	19472.40
	40	24.42	21644.24	6870.00	-	-	3043.04	3291.00	535.96	429.44	28943.68
Total	100	20.47	36643.34	10880.94	-	-	4581.53	5287.11	1012.30	891.80	48416.08
<i>Cerasus avium</i>	20	31.35	7513.13	2571.01	-	747.65	997.06	761.77	64.53	63.18	10147.32
<i>Quercus dalechampii</i>	4	20.00	844.80	224.20	-	-	106.80	102.40	15.00	13.00	1082.00
	36	29.63	19441.80	6557.40	-	1542.60	2773.80	1850.40	390.60	388.80	26388.00
Total	40	28.81	20286.60	6781.60	-	1542.60	2880.60	1952.80	405.60	401.80	27470.00
<i>Acer platanoides</i>	8	18.11	1017.40	259.97	-	-	71.74	167.26	20.97	19.16	1296.53
	12	24.00	2892.00	822.00	-	-	408.00	368.40	45.60	42.00	3756.00
Total	20	21.83	3909.40	1081.97	-	-	479.74	535.66	66.57	61.16	5052.53
Total association	548	27.64	229584.56	75212.74	661.16	14504.47	28965.63	26739.29	4342.19	3841.94	308639.24