

**Faunistic and ecological researches on the cicada fauna
(Homoptera, Auchenorrhyncha) in Cluj and Dej hilly area
(Bobâlna, Dăbâca, Vultureni), Romania**

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Rezumat:

**Cercetări faunistice și ecologice asupra cicadelor din zona
Dealurile Clujului și Dejului (Bobâlna, Dăbâca, Vultureni),
România**

Această contribuție prezintă comparativ fauna de cicadine din trei localități Bobâlna, Dăbâca și Vultureni din unitatea geografică Podișul Someșan. Au fost identificate 75 specii de cicadine din cinci familii. Este semnalată pentru prima dată în fauna Transilvaniei specia *Fagocyba carri* Edw., iar speciile *Japananus hyalinus* Osb. și *Doratura homophyla* sunt semnalate de noi a doua oară în fauna Transilvaniei. Specia dominantă în zona studiată este *Philaenus spumarius* L. S-a constatat, de asemenea, că factorul ecologic cel mai important care limitează răspândirea speciilor de cicadine în ecosistemele studiate este factorul trofic.

Keywords: Auchenorrhyncha, faunistics, ecology, "Podișul Someșan" (Romania)

The Cluj and Dej hilly area are located in the watershed of the tributaries of the Someșul Mare and Valea Almașului to the West, the Simișma valley and Valea Largă to the North, the Someșul Mic to the East, and the wide passage of the Capuș, the Paniceni Table and the Huedin depression. These hilly areas are characterized by a certain uniformity of the relief, according to the tabular structure of the geological strata. Thus, the relief is composed of a series of peaks with average altitudes of 450 - 550 m, seldom exceeding these values, either positively or negatively. These peaks are crossed by a series of passages, which favored the placement of human settlements (ROȘU 1988).

In this geomorphologic unit, we randomly chose three localities, separated by a certain distance: Bobâlna, Dăbâca and Vultureni (fig. 1).

From the geological point of view, the area consists mainly of deposits of sediments, lime, sandstone, conglomerates and volcanic tuff that belong to the Paleocene and the Inferior Miocene (ROȘU 1988).

In the three chosen localities, we analyzed the following types of ecosystems:

1. Oak and beech forests – these forests belong to the association *Quer-*

co – *Carpinetum* Soó et Pocs 57. These types of forests were found in Dăbâca and Vultureni localities. The dominant species are *Quercus cerris*, *Q. petraea*, *Carpinus betulus*, *Fagus sylvatica* and *Prunus avium*. The herbaceous layer of these forests is quite developed, and it consists of: *Lathyrus vernus*, *Anemone nemorosa*, *Stellaria holostea*, *Aposeris foetida*, *Carex pilosa*, *Dentaria bulbifera*, *Hepatica nobilis*, *Milium efusum*.

2. Oak Forest – this forest belong to the association *Quercetum petraee* – *cerris* Soó 57. In the studied area, we found only one forest of this type, around Bobâlna locality. In this forest, the shrubbery layer is also well developed: *Crataegus monogyna*, *Ligustrum vulgare*, *Rosa canina*, *Rhamnus tinctoria*. In the herbaceous layer, there are the following species: *Sedum maximum*, *Astragalus glycyphyllos*, *Carex montana*, *Cruciata glabra*, *Potentilla alba*, *Tanacetum corymbosum*, *Dictamnus albus*, *Trifolium medium*, *Geranium sanguineum*, *Vicia sylvatica*.

3. Meadows – were found in all of the three studied localities, located around the forests mentioned above. All these meadows belong to five types of vegetal associations:

- As. *Trifolo* – *Agrimonieta* TH. MÜLLER 62, contains herbaceous species with an obvious meso-xerophilous character, with typical species such as: *Trifolium medium*, *T. alpestre*, *Brachypodium sylvaticum*, *Chamaecytisus albus*, *Centaurea jacea*.

- As. *Festuco* – *Agrostetum* HORV. 51 consist of mesophilous meadows on the slopes with northern aspect, meadows that are frequently grazed and mowed. This association is made up of following species: *Festuca rubra* and *Agrostis capillaris*, aside from which we also found other mesophilous species, such as: *Lotus corniculatus*, *Leontodon autumnalis*, *Briza media*, *Polygala vulgaris*, *Trifolium montanum*.

- As. *Medicagini* – *Festucetum pratensis* COLDEA 81 contains mesophilous and meso-hygrophilous species, such as: *Agropyron repens*, *Achillea millefolium*, *Daucus carota*, *Equisetum pratense*, *Lysimachia nummularia*, *Prunella vulgaris*.

- As. *Scirpetum sylvaticae* SCHWIK. 44 contain hygrophilous phytocoenoses located along the brooks near the “Vultureni” Forest, the dominant species being *Scyrpus sylvaticus*; here we also found other hygrophilous species such as: *Carex hirta*, *Equisetum palustre*, *Bidens tripartita*, *Lycopus europaeus*, *Ranunculus repens*.

- As. *Urtico* – *Cruciatetum* DIERSCHKE 73 consists of nitrophilous phytocoenoses, around the “Vultureni” Forest. The dominant species is *Urtica dioica*, other nitrophilous species that live here being *Dactylis glomerata*, *Galium rubroides*, *Pastinaca sativa*.

The phytocoenologic characterization was performed according to COLDEA 2000.

Material and methods

Our study was carried out during the year 2000 in Bobâlna, Dăbâca and Vultureni localities, while choosing the optimum collecting period for cicada, which is between May and July.

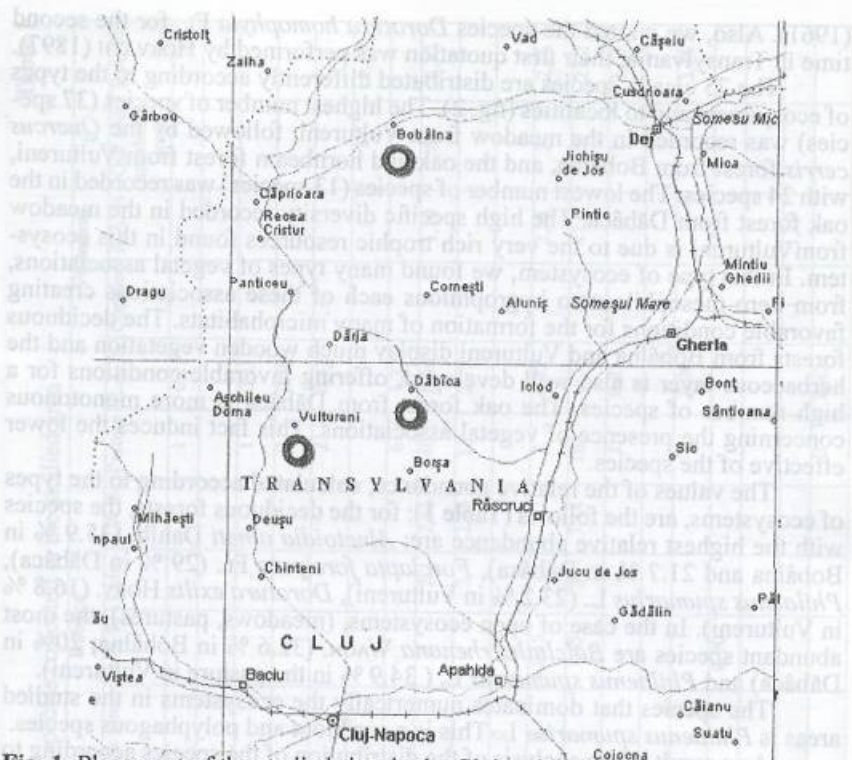


Fig. 1. Placement of the studied sites in the Cluj and Dej hilly area.

We collected the biological material using the entomological net for the species that live in the herbaceous layer, the umbrella-net for the species that live in the shrubbery and tree layers, and Barber traps for the brachypterous species and for larvae. We collected both quantitative and qualitative samples. For the quantitative samples we used 50 mows / sample, constantly.

Results and discussion

Our study is performed in the Someș Table (Bobâlna, Dăbâca and Vultureni) was concluded with the identification of 75 cicada species, which belong to 5 families and 56 genera. We analyzed a total number of 980 individuals (Table 1). These results prove that the cicada fauna in the Someș Table is relatively rich, if we compare it to the results that we obtained in other parts of Transylvania, (POPA 1999, 2000a, 2000b).

The cicada fauna in the three studied localities is very interesting. Thus, we have identified *Fagocyba carri* Edw., a species that was never quoted before in the fauna of Transylvania. Another distinctive species is *Japananus hyalinus* Osb. The identification of this species in the studied area is its second quotation in Transylvania fauna; its first quotations belongs to DLABOLA

(1961). Also, we quoted the species *Doratura homophyla* FL. for the second time in Transylvania; their first quotation was performed by HORVÁTH (1897).

The 75 cicada species are distributed differently according to the types of ecosystems and to localities (fig. 2). The highest number of species (37 species) was recorded in the meadow from Vultureni, followed by the *Quercus cerris* forest from Bobâlna, and the oak and hornbeam forest from Vultureni, with 24 species. The lowest number of species (13 species) was recorded in the oak forest from Dăbâca. The high specific diversity recorded in the meadow from Vultureni is due to the very rich trophic resources found in this ecosystem. In this type of ecosystem, we found many types of vegetal associations, from xero-mesophilous to hygrophilous each of these associations creating favorable conditions for the formation of many microhabitats. The deciduous forests from Bobâlna and Vultureni display much wooden vegetation and the herbaceous layer is also well developed, offering favorable conditions for a high number of species. The oak forest from Dăbâca is more monotonous concerning the presence of vegetal associations. This fact induces the lower effective of the species.

The values of the relative abundance, calculated according to the types of ecosystems, are the follows (Table 1): for the deciduous forests, the species with the highest relative abundance are: *Alnetoidia alneti* Dahlb. (35.9 % in Bobâlna and 21.7 % in Dăbâca), *Forciapta forcipata* FL. (29 % in Dăbâca), *Philaenus spumarius* L. (23.2 % in Vultureni), *Doratura exilis* HORV. (16.8 % in Vultureni). In the case of open ecosystems, (meadows, pastures), the most abundant species are *Balclutha rhenana* WAGN. (32.6 % in Bobâlna; 20% in Dăbâca) and *Philaenus spumarius* L. (34.9 % in the pasture in Vultureni).

The species that dominates numerically the ecosystems in the studied areas is *Philaenus spumarius* L. This is a euribiont and polyphagous species.

As a result of the analysis of the distribution of the species according to localities and to the types of ecosystems, we found that the majority of the species that we identified are stenotope (67%) (fig. 3). Concerning the ecological preferences of the species from the studied area, the majority of the species are praticolous and only 19 % are euribiont (fig. 4). These results shows that the cicada species identified in Bobâlna, Dăbâca and Vultureni have high ecological demands. Similar ecosystems located in different localities, that present different vegetal associations, demonstrate the fact that the trophic factor is one of the most important ecological factors that limits the distribution of the cicada species in the three studied localities.

Conclusions

1. The research performed in the Someș Table (Bobâlna, Dăbâca and Vultureni) was concluded with the identification of 75 cicada species that belong to 5 families and 56 genera, which indicates a relatively rich fauna.

2. We quoted a new species for the fauna of Transylvania: *Fagocyba carri* EDW., and two species, *Japananus hyalinus* OBS. and *Doratura homophyla* FL. were quoted for the second time in the fauna of Transylvania.

3. The highest number of species was recorded in the pasture from Vultureni, and the lowest number of species in the oak forest from Dăbâca.

Checklist of cicada species collected in the studied area

Table 1

Species	Bobalna			Dabaca				Vultureni							
	Oak forest	R.A. %	Mdw	R.A. %	Oak forest	R.A. %	Mdw	R.A. %	Pasture	R.A. %	Coppice	R.A. %	Oak and hornbeam forest	R.A. %	
<i>Reptahus panzeri</i> (LOW, 1883)									1	0,21					
<i>Asiraca clavicornis</i> (FABRICIUS, 1794)			1	1,16											
<i>Kelisia guttula</i> (GERMAR, 1818)									1	0,21					
<i>Kelisia monoceros</i> RIBAUT, 1934									2	0,42					
<i>Stroma bicarinata</i> (HERRICH-SCHAEFFER, 1835)									2	0,42					
<i>Dicranotropis</i> (s.str.) <i>hamata</i> (BOHEMAN, 1847)													1	1,05	
<i>Ribautodelphax</i> sp.									6	1,27					
<i>Lepyronia coleoptrata</i> (LINNAEUS, 1758)	1	0,97	5	5,81				2	2,86	40	8,46	1	1,19	6	6,32
<i>Neophilaenus campestris</i> (FALLEN, 1805)	1	0,97	6	6,98				2	2,86	13	2,75				
<i>Neophilaenus lineatus</i> (LINNAEUS, 1758)	1	0,97			2	2,90									
<i>Aphrophora alni</i> (FALLEN, 1805)	1	0,97	1	1,16	1	1,45			2	0,42	2	2,38	2	2,11	
<i>Philaenus spumaris</i> (LINNAEUS, 1758)	3	2,91	16	18,6	1	1,45	5	7,14	165	35	40	47,6	22	23,2	
<i>Centrotus cornutus</i> (LINNAEUS, 1758)									1	0,21			1	1,05	
<i>Ulopa trivialis</i> GERMAR, 1821			1	1,16											
<i>Megophthalmus scanicus</i> (FALLEN, 1806)									5	1,06			3	3,16	
<i>Ledra aurita</i> (LINNAEUS, 1758)					2	2,90									
<i>Oncopsis flavicollis</i> (LINNAEUS, 1758)	4	3,88													
<i>Macropsis</i> sp.											1	1,19			
<i>Hephathus namus</i> (HERRICH-SCHAEFFER, 1835)									2	0,42					

Species	Bobalna				Dabaca				Vultureni					
	Oak forest	R.A. %	Mdw	R.A. %	Oak forest	R.A. %	Mdw	R.A. %	Pasture	R.A. %	Coppice	R.A. %	Oak and hornbeam forest	R.A. %
<i>Anaceratagalla venosa</i> (FOURCROY, 1785)							1	1,43	2	0,42				
<i>Anaceratagalla ribauti</i> (OSSIANNILSSON, 1938)									7	1,48				
<i>Iassus lanio</i> (LINNAEUS, 1761)													2	2,11
<i>Aphrodes makarovi</i> ZACHVATKIN, 1948	1	0,97	1	1,16					30	6,13	1	1,19	4	4,21
<i>Anoscopus flavostriatus</i> (DONOVAN, 1799)											1	1,19		
<i>Evacanthus acuminatus</i> (FABRICIUS, 1794)													1	1,05
<i>Errhomemus brachypterus</i> FIEBER, 1866					2	2,90								
<i>Cicadella viridis</i> (LINNAEUS, 1758)							2	2,86	2	0,42				
<i>Alebra albostriella</i> (FALLEN, 1826)	13	12,6											2	2,11
<i>Forcipata citrinella</i> (ZETTERSTEDT, 1828)					1	1,45								
<i>Forcipata forcipata</i> (FLOR, 1861)	3	2,91			20	29,0	11	15,7			2	2,38	2	2,11
<i>Empoasca</i> sp.													2	2,11
<i>Chlorita paoli</i> (OSSIANNILSSON, 1939)									9	1,9				
<i>Fagocyba carri</i> (EDWARDS, 1914)	5	4,85												
<i>Fagocyba douglasi</i> (EDWARDS, 1878)	9	8,74			8	11,6								
<i>Ribautiana scalaris</i> (RIBAUT, 1931)	5	4,85			3	4,35							1	1,05
<i>Typhlocyba</i> (s.str.) <i>quercus</i> (FABRICIUS, 1777)	4	3,88			9	13,0								
<i>Typhlocyba</i> (<i>Zonocyba</i>) <i>bifasciata</i> BOHEMAN, 1851	2	1,94												
<i>Eurhadina pulchella</i> (FALLEN, 1806)	2	1,94												
<i>Eupteryx curvata</i> (LINNAEUS, 1758)	2	1,94									2	2,38		

Species	Bobalna				Dabaca				Vultureni					
	Oak forest	R.A. %	Mdw	R.A. %	Oak forest	R.A. %	Mdw	R.A. %	Pasture	R.A. %	Coppice	R.A. %	Oak and hornbeam forest	R.A. %
<i>Eupteryx signatipennis</i> (BOHEMAN, 1847)							1	1,43						
<i>Eupteryx urticae</i> (FABRICIUS, 1803)											1	1,19		
<i>Eupteryx calcarata</i> (OSSIANILSSON, 1936)									6	1,27	15	17,9		
<i>Eupteryx cyclops</i> MATSUMURA, 1906											3	3,57		
<i>Eupteryx stachydearnum</i> (HARDY, 1850)					4	5,80							2	2,11
<i>Eupteryx notata</i> CURTIS, 1837							1	1,43			1	1,19		
<i>Alnetoidia alneti</i> (DAHLBOM, 1850)	37	35,9			15	21,7								
<i>Arboridia parvula</i> (BOHEMAN, 1845)	1	0,97												
<i>Arboridia ribauti</i> (OSSIANILSSON, 1937)	2	1,94											1	1,05
<i>Japananus hyalinus</i> (OSBORN, 1900)													7	7,37
<i>Balchluta punctata</i> (FABRICIUS, 1775)			2	2,33					3	0,63			1	1,05
<i>Balchluta rhenana</i> WAGNER, 1939	1	0,97	28	32,6			14	20	2	0,42	4	4,76		
<i>Macrosteles viridigriseus</i> (EDWARDS, 1924)									1	0,21	1	1,19		
<i>Deltocephalus pulicaris</i> (FALLEN, 1806)							1	1,43	16	3,38			2	2,11
<i>Doratura exilis</i> HORVATH, 1903									25	5,29			16	16,8
<i>Doratura stylata</i> (BOHEMAN, 1847)									28	5,92				
<i>Doratura homophyla</i> (FLOR, 1861)			2	2,33										
<i>Platymetopius major</i> (KIRSCHBAUM, 1868)	1	0,97												
<i>Allygidius</i> (s.str.) <i>atomarius</i> (FABRICIUS, 1794)	1	0,97												
<i>Graphocraerus ventralis</i> (FALLEN, 1806)			1	1,16			1	1,43						

Species	Bobalna				Dabaca				Vultureni					
	Oak forest	R.A. %	Mdw	R.A. %	Oak forest	R.A. %	Mdw	R.A. %	Pasture	R.A. %	Coppice	R.A. %	Oak and hornbeam forest	R.A. %
<i>Cicadulla</i> (s.str.) <i>quadrinotata</i> (FABRICIUS, 1794)									12	2,54	4	4,76		
<i>Euscellis incisus</i> (KIRSCHBAUM, 1858)									5	1,06	1	1,19	1	1,05
<i>Sireptanus aemulans</i> (KIRSCHBAUM, 1868)									1	0,21				
<i>Sireptanus confinis</i> (REUTER, 1880)									2	0,42				
<i>Artamus interstitialis</i> (GERMAR, 1821)									23	4,86	1	1,19	5	5,26
<i>Selenocephalus obsoletus</i> (GERMAR, 1817)	2	0,97												
<i>Metalimnus formosus</i> (BOHEMAN, 1845)									1	0,21	2	2,38		
<i>Psammotettix alienus</i> (DAHLBOM, 1850)			3	3,49										
<i>Psammotettix cephalotes</i> (HERRICH-SCHAFFER, 1834)							10	14,3	1	0,21				
<i>Psammotettix confinis</i> (DAHLBOM, 1850)			5	5,81			2	2,86	8	1,69				
<i>Errastunus ocellaris</i> (FALLEN, 1806)									21	4,44			1	1,05
<i>Turrutus socialis</i> (FLOR, 1861)									12	2,54	1	1,19	5	5,26
<i>Jassargus (Arrailus) flori</i> (FIEBER, 1869)	1	0,97	14	16,3	1	1,45	13	18,6	9	1,9			5	5,26
<i>Verdanus abdominalis</i> (FABRICIUS, 1803)							3	4,29						
<i>Arthaldeus striifrons</i> (KIRSCHBAUM, 1869)									4	0,21				
<i>Mocuellus</i> (s.str.) <i>collinus</i> (BOHEMAN, 1850)							1	1,43	3	0,63				
Number of species	24		14		13		16		37		19		24	
Number of individuals	103		86		69		70		473		84		95	980

R.A. %= Relative abundance

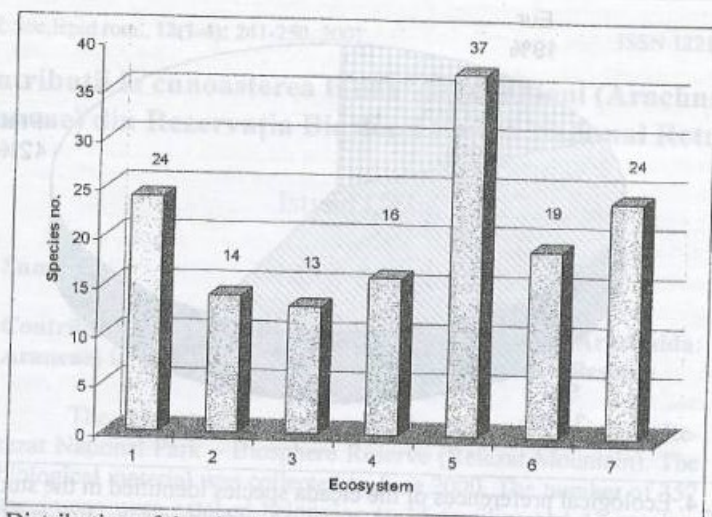


Fig. 2. Distribution of the cicada species on ecosystems

Abbreviations: 1-Oak forest (Bobalna), 2-Meadow (Bobalna), 3-Oak forest (Dabaca), 4-Meadow (Dabaca), 5-Pasture (Vultureni), 6-Coppice (Vultureni), 7-Oak and hornbeam forest (Vultureni)

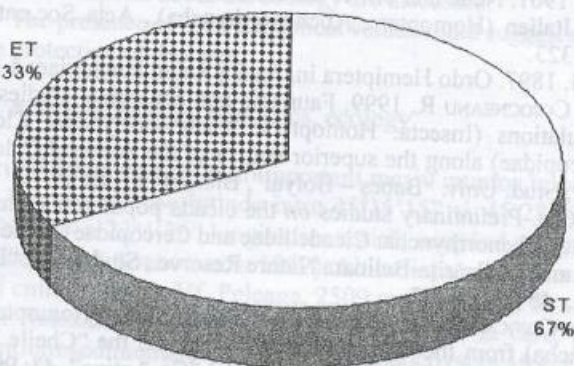


Fig. 3. Eurytopy and stenotopy of the cicada species identified in the studied area

Abbreviations: ST-stenotop species, ET-eurytop species

4. The species that numerically dominates the ecosystems in the studied areas is *Philaenus spumarius* L.

5. The most important ecological factor that limits the distribution of the cicada species in the three studied localities is the trophic one.

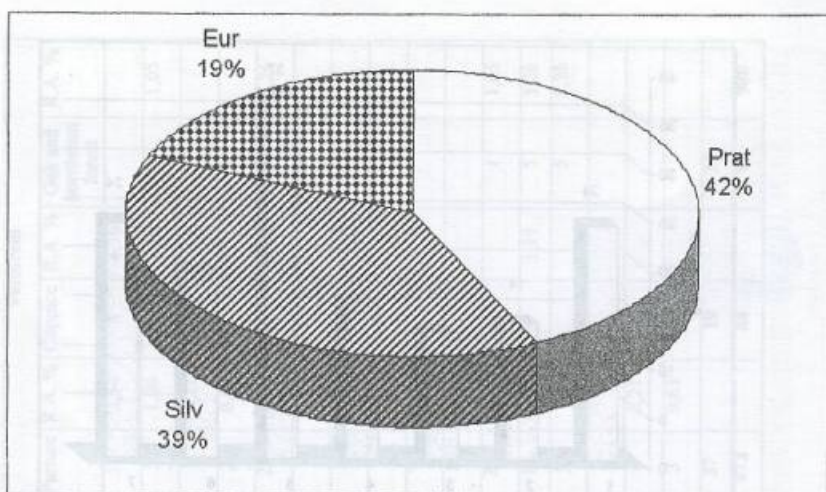


Fig. 4. Ecological preferences of the cicada species identified in the studied area
Abbreviations: Prat-praticolous species, Silv- sylvan species, Eur-euribiont species

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