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A study on leaf-beetle fauna (Coleoptera: Chrysomelidae) in Vâlcele area (District of Covasna, Transylvania, Romania)

Laura NISTOR

Rezumat

Studiu asupra faunei de crizomelide (Coleoptera: Chrysomelidae) in zona Vâlcele (judeţul Covasna, Transilvania, România)

În această lucrare sunt prezentate 56 specii de Chrysomelidae (Coleoptera), aparţinând la 8 subfamilii, colectate în vara anului 2001. Subfamilia dominantă este Alticinae cu 39 de specii, specia dominantă, *Chaetocnema (Chaetocnema) obesa* (BOIELDIEU,1859) aparţinând şi ea la această subfamilie. Sunt discutate aspecte ecologice referitoare la bogăţia în specii a diferitelor ecosisteme şi ecotonuri cercetate. Deasemenea sunt menţionate şi câteva specii mai rare.

Keywords: leaf- beetle fauna, ecosystems, Vâlcele area.

The earliest data on leaf- beetle fauna of Transylvania are found in studies of SIEDLITZ (1891) and PETRI (1912, 1920). Later KONNERT-IONESCU (1963), GRUEV et all. (1963) dealed with leaf- beetles of this region.

A continuous study on leaf- beetle fauna of Transylvania it was started since 1992: CRIŞAN (1993, 1994), CRIŞAN & TEODOR (1994), CRIŞAN & BONEA(1995), SZEL et all. (1996), BALOG (1998), CRIŞAN et all.(1998, 1999, 2000), KUTASI (1999), NISTOR et all. (2000).

The leaf- beetle fauna in Vâlcele area (district of Covasna) have not been studied before this paper.

Material and methods

This study was undertaken during the summer of 2001 in the zone of Vâlcele (district of Covasna). This is an area situated about 9 km South- West from town Sfântu- Gheorghe, on the western slopes of the southern part of Baraoltului- Mountains.

In this area the samples were taken in two major ecosystems: a deciduous forest (*Carpenus betulus, Fraxinus excelsior, Querqus robur)*, situated

on strongly titled slopes and in some lawns with different characteristics: mezophilous lawns which were mostly plains; xerophilous lawns situated especially on the southern slopes of some hillocks; hygrophilous lawns, situated in a valley nearby a brook. In order to make ecological comparisons I took samples also from the skirts, which represent an ecoton, and from strongly grazed mesophilous lawn.

Samples were taken monthly, between 29 of May and 30 of August, by an entomological net. Each sample was consisted on 50 sweeps. Specimen captured in this way were placed in 70° alcohol and then kept dry. Their identification was made in the laboratory, at a stereomicroscope, using different bibliographical sources: FREUDE et all. (1966), KASZAB (1962-1971), PANIN (1951), ROZNER (1996), WARCHALOWSKI (1993).

Results, discussion and conclusion

In the studied area we captured 276 individuals that belong to 56 leaf-beetle species of 18 genera and 8 subfamilies.

Table 1 presents them, showing their abundance, date and ecosystem of capture.

Table 1

The Chrysomelidae species collected in zone of Vâlcele (District of Covasna, Transylvania, Romania), in the summer of 2001

Subfamily/ species	coll. date	nr. ind.	abund. species%	ecosystems and ecotones
Criocerinae Latreille,1807				
Lilioceris lilii (Scopoli,1763)	29 V	1	0,36	forest h.
Oulema (Haspidolema) galeciana (Heyden,1870)	15 VII	1	0,36	M-lawn
Clytrinae Kirby,1837				
Labidostomis longimana (Linnaeus,1761)	29 V	1		M-lawn
	29 V	1	1,8	forest h.
	15 VII	2		M- lawn
	15 VII	1		M- lawn
Cryptocephalinae Gyllenhal, 1813				
Cryptocephalus (Cryptocephalus) moraei (Linnaeus,1758)	29 V	1		forest h.
	29 V	1		skirts h.
	30 VI	2	5,05	M-lawn
	15 VII	3		skirts h.
	15 VII	3		forest t.
	15 VII	4		M- lawn
Cryptocephalus (Burlinius) bilineatus (Linnaeus,1767)	15 VII	1	0,36	M-lawn,g.
Cryptocephalus (Burlinius) elegantulus Gravenhorst,1807	30 VI	1	0,36	skirts h.

Subfamily/ species	coll. date	nr. ind.	abund. species%	ecosystems and ecotones
Cryptocephalus (Cryptocephalus) hypochoeridis hypochoeridis (Linnaeus,1758)	30 VI	1	0,36	M-lawn
Lamprosominae Lacordaire,1848				
Omorphus (Omorphus) concolor (Sturm,1807)	30 VI 30 VIII	1 1	0,72	skirts h. X- lawn
Chrysomelinae Latreille,1802				
Chrysolina (Chalcoidea) carnifex ssp. coerulescens (Suffrian, 1851)	30 VI 30 VI	1 2	1,08	M- lawn forest h.
Chrysolina (Fastuolina) fastuosa (Scopoli,1763)	15 VIII	1	0,36	forest h.
Phaedon(Phaedon) armoraciae (Linnaeus,1758)	15 VII	1	0,36	forest t.
Phaedon (Phaedon) cochleariae (Fabricius,1792)	15 VIII	1	0,36	M- lawn,g.
Galerucinae Latreille,1802				
Galerucella (Neogalerucela) lineola (Fabricius,1781)	29 V	1	0,36	H-lawn
Alticinae Kutschera,1859				
Phyllotreta undulata (Kutschera,1860)	29 V 29 V 15 VII 15 VIII	1 1 1 1	1,44	skirts a. H- lawn M- lawn, g. M- lawn, g.
Phyllotreta nemorum (Linnaeus, 1758)	29 V	1	0,36	M- lawn
Phyllotreta vittula (Redtenbacher,1849)	29 V 15 VII	1 1	0,72	skirts h. forest h.
Aphtona coerulea (Geoffroy,1785)	15 VII	1	0,36	skirts h.
Aphtona lacerosa (Rosenhauer,1847)	15 VII 15 VIII	2 1	1,08	M- lawn X- lawn
Aphtona euphorbiae (Schrank, 1781)	15 VIII	1	0,36	H- lawn
Longitarsus (Longitarsus) luridus (Scopoli,1763)	29 V	6	2,16	M- lawn
Longitarsus (Longitarsus) albineus (Foudras,1860)	29 V	1	0,36	X- lawn
Longitarsus (Testergus) anchusae (Paykull,1799)	29 V	1	0,36	skirts h.
Longitarsus parvulus (Paykull,1799)	29 V	1	0,36	skirts h.
Longitarsus (Longitarsus) substriatus Kutschera, 1863	15 VII 15 VII	3 2	1,8	skirts h. forest h.

Subfamily/ species	coll. date	nr. ind.	abund. species%	ecosystems and ecotones
Longitarsus (Longitarsus) lycopi (Foudras, 1860)	15 VII	2	5,77	forest t.
	15 VII	1		M- lawn, g.
	15 VII	8		M- lawn
	15 VIII	4		M- lawn, g.
	15 VIII	1		X- lawn
Longitarsus (Longitarsus) melanocephalus (De Geer, 1775)	15 VII	1	1,08	forest t.
	15 VIII	2		M- lawn, g.
Longitarsus (Longitarsus) rubellus (Foudras, 1860)	15 VII	3		H- lawn
	15 VII	1	6,85	M- lawn, g.
	15 VII	14		M- lawn
	15 VIII	1		M- lawn,g.
Longitarsus (Longitarsus) waterhousei Kutschera,1864	15 VII	6	2,16	H- lawn
Longitarsus (Longitarsus) linnaei (Duftschmid,1825)	15 VII	1	0,36	M- lawn, g.
Longitarsus (Longitarsus) rubiginosus (Foudras,1860)	15 VII	1	14,07	M- lawn
	15 VII	18		skirts h.
	15 VIII	20		H- lawn
Longitarsus (Longitarsus) brunneus (Duftschmid,1825)	15 VIII	2	1,08	M- lawn, g.
	15 VIII	1		M- lawn
Longitarsus (Longitarsus) nasturtii (Fabricius,1792)	15 VIII	1	0,36	M- lawn, g.
Longitarsus (Longitarsus) pulmonariae Weise,1893	15 VIII	3	7,58	forest h.
	15 VIII	18		X- lawn
Longitarsus (Longitarsus) jacobaeae (Waterhouse,1858)	15 VIII	1	0,36	skirts h.
Altica oleracea (Linnaeus, 1758)	30 VI	1		skirts h.
	15 VII	3	2,88	M- lawn
	15 VIII	4		X- lawn
Asiorestia ferruginea (Scopoli,1763)	29 V	5		M- lawn
	29 V	1		H- lawn
	29 V	1		skirts h.
	15 VII	1	4,69	forest h.
	15 VII	3		H- lawn
	15 VIII	1		skirts h.
	15 VIII	1		H- lawn
Asiorestia transversa (Marsham,1802)	30 VI	1		skirts h.
	30 VI	2	1,44	forest h.
	15 VII	1		forest h.
Asiorestia crassicornis (Faldermann, 1837)	15 VII	1	0,36	forest h.
Asiorestia melanostoma (Redtenbacher, 1849)	29 V	1	0,36	forest h.
Hippuriphila modeeri (Linnaeus,1761)	15 VIII	2	0,72	H- lawn

Subfamily/ species	coll. date	nr. ind.	abund. species%	ecosystems and ecotones
Crepidodera aurata (Marsham,1802)	29 V 15 VII	4 1	1,8	M- lawn H- lawn
Chaetocnema (Chaetocnema) obesa (Boieldieu, 1859)	29 V 29 V 30 VI 30 VI 15 VII 15 VII	6 30 4 4 1 6	18,4	M- lawn X- lawn skirts h. X- lawn forest t. H- lawn
Chaetocnema (Chaetocnema) hortensis (Geoffroy, 1758)	29 V	6		X- lawn
Chaetocnema (Chaetocnema) arenacea (Allard, 1860)	30 VI	1	0,36	X- lawn
Chaetocnema (Tlanoma) tibialis (Illiger,1807)	29 V 29 V	1 1	0,72	forest h. H- lawn
Chaetocnema (Tlanoma) semicoerulea (Koch, 1803)	15 VIII	1	0,36	skirts h.
Chaetocnema (Tlanoma) concinna (Marsham, 1802)	15 VIII	1	0,36	skirts h.
Chaetocnema (Tlanoma) heikertingeri Ljubitscheff1963, Gruev, Tomov and Merkl (1987)	30 VI	2	0,72	skirts h.
Chaetocnma (Tlanoma) chlorophana (Duftschmid, 1825)	30 VI	1	0,36	X- lawn
Dibolia (Diblia) occultans (Koch,1803)	15 VII	2	0,72	M- lawn
Dibolia (Dibolia) orientalis Weise, 1893	15 VIII	1	0,36	X- lawn
Dibolia (Dibolia) timida (Illiger, 1807)	30 VI	1	0,36	X- lawn
Cassidinae Gyllenhal, 1813				
Cassida (Mionycha) subreticulata Suffrian, 1844	29 V	1	0,36	X- lawn
Cassida (Cassida) lineola Creutzer, 1799	15 VII	1	0,36	forest t.
Cassida (Cassida) denticollis Suffrian, 1844	15 VII	1	0,36	M- lawn
Cassida (Cassida) pannonica Suffrian, 1844	30 VI	2	0,72	M- lawn

Abbreviations: H= hygrophilous, M= mezophilous, X= xerophilous, h= herbous vegetation, t= trees, g= grazed, a= arbustive vegetation.

Regarding the subfamilies, the dominant one is Alticinae subfamily with 39 species (137 individuals) representing 69,64% of the whole captured species. All the other subfamilies having a minor representation. Fig.1.

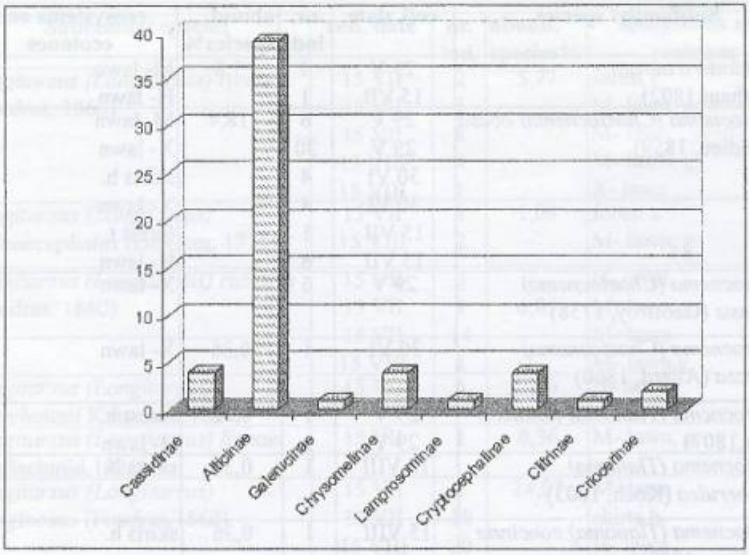


Fig.1. Histogram of the representation of leaf-beetle subfamilies, according to the number of species

Dominant genera are *Longitarsus* (Alticinae) with 15 species, followed by *Chaetocnema* (Alticinae) with 8 species. Other better represented genera are: *Cryptocephalus* (Cryptocephalinae), *Asiorestia* (Alticinae) and *Cassida* (Cassidinae) every one of them having 4 species.

The most dominant species is *Chaetocnema (Chaetocnema) obesa* (Boildieu,1859) among Alticinae with 51 individuals, representing 18,5% of the whole captured leaf- beetle individuals and 37,2% of the whole captured individuals of Alticinae subfamily. *Chaetocnema obesa* is the one of the captured species which was found in all the sampled ecosystems and ecoton, except the grazed mezophilous lawn. This result is due to the fact that this species is a cosmopolite one, being characteristic for very different biotopes, from higrophilous to xerophilous ones. The highest number of individuals of this species was found in the xerophilous lawns. This expresses the specificity of *Chaetocnema obesa* for xerophilous vegetation. The highest number of individuals of this species was in the samples taken in May, at the end of the summer the species being represented by a smaller number of individuals. This is due maybe to the wet climatic conditions at the end of July. Fig.2.

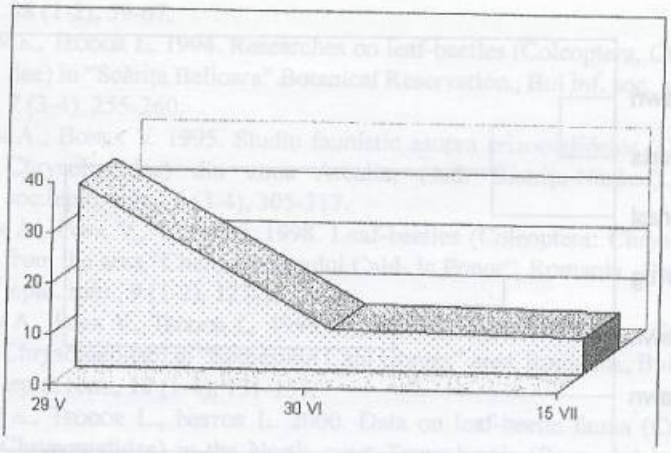


Fig.2. The number of individuals of the dominant species as function of the time of the collection

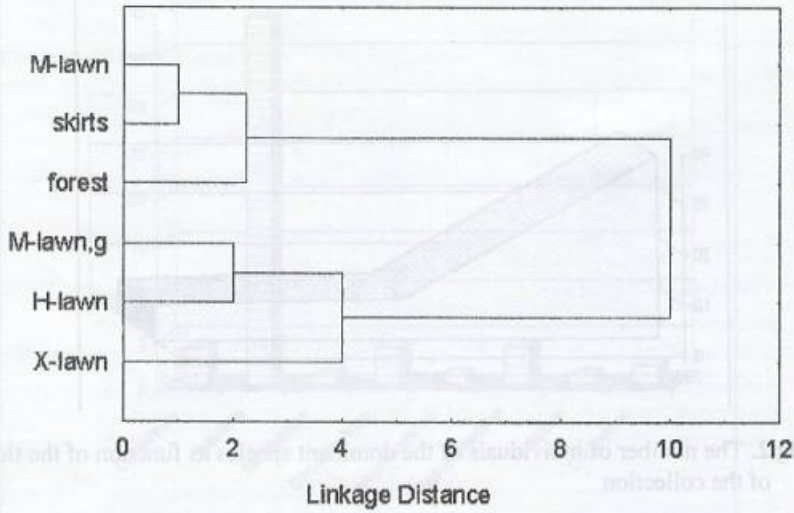
Other species with a higher abundance were also from Alticinae subfamily, namely *Longitarsus (Longitarsus) rubiginosus* (Foudras,1860) with 39 individuals, a relative rare species in other regions, characteristic for hygrophile lawns, followed by some common ones like: *Longitarsus (Longitarsus) pulmonariae* Weise,1893 with 21 individuals, *Longitarsus (Longitarsus) rubellus* (Foudras,1860) with 19 individuals and *Longitarsus (Longitarsus) lycopi* (Foudras,1860) with16 individuals.

This absolute dominance of Alticinae can be explained by the characteristics of the vegetation, which was mostly herbaceous both in lawns and in skirts. But we also can explain these results by the climatic conditions of this summer. During the period of the collection only July was a wet month, all the others being droughty.

The richness in species of different ecosystems and ecoton sampled, gives the quantitative similarity, shown in dendogram below . Fig.3.

The highest number of species (19 species) was signaled in mezophilous lawns, which were followed by the skirts (18 species) and the forest (17 species). This result expresses a real situation, because in the greatest number of cases the sampled skirts were a passage between these two major ecosystems, the mezophilous lawns and the forest. Many of the species found in such lawns and in the forest also occur in the skirts.

Other two similar ecosystems, regarding the number of species found in them, are the hygrophilous (13 species) and the xerophilous (11 species) lawns, respectively. This is because the heterogenity of the leaf- beetles group, which presents species adapted to hygrophilous conditions as well as species



adapted to xerophilous ones.

Fig.3. The ecological similarity of different ecosysems and ecoton, according to the number of species **Abbreviations:** M=mezophilous, H=higrophilous, X= xerophilous, g=grazed.

The least number of species (9 species) was in the grazed lawns. All the species occur here are very common and beyond this they were signaled in a very small number of individuals. This means that anthropic impact affect negatively the biodiversity of the leaf- beetle fauna.

The qualitative side of this study signal some rare species. Among them are such as: *Omorphus (Omorphus) concolor* (STURM, 1807), *Chrysolina (Chalcoidea) carnifex* ssp. *coerulescens* SUFFRIAN, 1851, *Phaedon (Phaedon) armoraciae* LINNAEUS, 1758), *Asiorestia crassicornis* (FALDERMAN, 1837), *Dibolia (Dibolia) orientalis* WEISE, 1893 and *Dibolia (Dibolia) timida* (ILLIGER, 1807).

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Laura NISTOR
Faculty of Biology and Geology
Clinicilor Street, 5-7
RO-3400 Cluj- Napoca

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