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Leaf-beetles (Coleoptera, Chrysomelidae) from the Eastern Cluj Hills „Natura 2000" Site

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SUMMARY. An investigation made in June 2014 on leaf-beetles in "Eastern Cluj Hills, Natura 2000 Site" revealed the presence of 49 species, from 6 subfamilies. Results prove an improvement of general ecological conditions of the area, the xero-mesophilous character of the vegetation and the importance of the group as indicator for human impact. Dominant species of the area, as well as rare and endangered ones, are also mentioned and discussed.

Keywords: leaf-beetles, habitat influence, human impact, rare species.

Introduction

Leaf-beetles were scarcely treated in Romanian scientific literature until the last decade of the 20th century (Seidlitz, 1891; Petri, 1912; Flack, 1905; Marcu, 1927, 1928, 1936, 1957; (old literature); Konnerth-Ionescu, 1963; Negru, 1967, 1968; Ieniştea, 1968, 1974, 1975; Roşca, 1973, 1974, 1976; Bobârnac, 1974 (more recent literature). In the last decade of the 20th century and the beginning of the 21st century some researchers developed more focused studies on faunal and ecological aspects of this group (Crişan, 1993a, b, 1994, 1995, 1997, 2004, 2006a, b, 2007, 2009, 2010, 2011, 2012, 2014; Crişan and Bonea, 1995; Crişan and Teodor, 1996, 1998, 2002, 2005; Crişan and Druguş, 2001; Crişan and Balint, 2007, 2010; Crişan *et al*., 1998, 1999, 2000, 2003; Ilie, 2001; Ilie and Chimişliu, 2000; Maican, 2005; Maican and Serafim, 2001; Gruev *et al.,* 1993). Between these, one of our papers, published in 2000, deals with leaf-beetles in the North-Western part of Transylvania and include also some areas from the Eastern Cluj Hills, Natura 2000 Site (the areas Dăbâca and Vultureni), so that we could discuss and compare these data, this being the first purpose of the present paper. The second purpose was to establish the degree of influence induced by the method of meadow mowing in leaf-beetles, and if the group could be considered a good indicator for the human influence on ecosystems.

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Materials and methods

Leaf- beetle material was collected in June 2014, with the occasion of a large project for monitoring protected species in the Eastern Cluj Hills „Nature 2000"site, developed by a group of researchers. The paper refers only to the leaf-beetles active as adults in that period of the year. Insects were captured with an insect net by striking the vegetation 50 times, approximate 25 m^2, in three repetitions, in each area. We collected material from the following areas:

-Bădeşti village – a natural grassland, about 12 ha, used as hay meadow, not mown at the collection dates;

-Dăbâca village 1. – a large glade, about 3 ha, in a deciduous forest, not mown or grazed at the collection dates;

-Dăbâca village 2. – a pasture in an abandoned meadow, about 5 ha, moderately grazed at the collection dates;

-Dăbâca village 3. – an intensively grazed pasture, about 20 ha, neighboring a deciduous forest;

-Deuş village – a moderately grazed pasture, about 7 ha, not far from a deciduous forest;

-Pâglişa village – a hay meadow extended into an oak forest edge, about 14 ha, partially mown and moderately grazed at the collection dates;

-Vultureni village – an extended meadow, about 25 ha, neighboring a large oak forest, partially mown and grazed at the collection dates.

We remark that in each sampling places wooden vegetation was also present, represented by very sparse bushes or young trees, species as: *Rosa canina, Cornus sanguinea, Crataegus monogyna, Prunus spinosa, Lygustrum vulgare, Viburnum opulus, Corylus avellana, Euonymus europaeus, young Quercus species, Acer campestre, Acer pseudoplatanus, Carpinus betulus, Tilia cordata, Salix caprea, Betula verrucosa* etc., which were also sampled if they were met in the predetermined sampling perimeter.

Leaf-beetle material was collected in 70% alcohol and then was kept dry. Species were analysed in the laboratory, using a stereo-microscope and the appropriate literature (Mohr, 1966; Kaszab 1962-1971; Panin, 1951; Warchalowski, 1993, 2003; Kippenberg and Doberl, 1994; Rozner, 1996; Maican, 2005) for identification and classification.

Results and discussion

1. In the investigated areas we identified a number of 49 species of leaf-beetles from 6 subfamilies, which are listed in Table 1, following the taxonomical order of subfamilies and genera, indicating also the capture date, the number of individuals in each species, and the habitat and place of capture. This represent a

great diversity of leaf-beetles, considering also the fact that it is represented by a single-month capture period. The comparison with the same capture period of the year 2000 (Crişan *et al*., 2000), when only 36 species of leaf-beetles were registered, indicate a general improvement of the habitat conditions in the present, mostly by an enlargement and consolidation of the mown habitats to the prejudice of the agricultural lands.

Table 1.

Leaf-beetles recorded in June 2014 in the „Eastern Cluj Hills" Nature 2000 site.

Crt. No.	Subfamily/ Species	Capture date	No. ind.	Ecol. cat.	Habitat/ place
	I. Clytrinae, Kirby, 1837 **(32)***				
1	*Labidostomis longimana* (Linnaeus, 1761)	05.06	16	p., pr.	Ba.
		05.06	5		Da.1.
		19.06	4		Pa.
		19.06	1		De.
2	*Clytra quadripunctata* (Linnaeus, 1758)	05.06	3	p., sy.	Vu.
		05.06	3		Da.1.
3	*Clytra laeviscula* (Ratzenburg, 1837)	19.06	6	p., sy.	Da.2.
4	*Smaragdina (Monrosia) aurita* (Linnaeus, 1767)	05.06	12	p., sy.	Ba.
		05.06	1		Vu.
		05.06	2		Da.1.
		19.06	1		De.
		19.06	1		Da.3.
		19.06	3		Pa.
5	*Coptocephala unifasciata* (Scopoli, 1763)	19.06	8	p., pr.	Da.3.
	II. Cryptocephalinae, Gyllenhal, 1813 **(78)***				
6	*Cryptocephalus (Cryptocephalus) sericeus* (Linnaeus, 17589	05.06	4	p., eu.	Ba.
		19.06	3		Pa.
		19.06	1		Da.2.
7	*Cryptocephalus (Cryptocephalus) hypochoeridis* (Linnaeus, 1758)	05.06	19	p., eu.	Ba.
		05.06	7		Vu.
		05.06	2		Da.1.
		19.06	1		Da.2.
		19.06	1		De.
8	*Cryptocephalus (Cryptocephalus) octacosmus* Bedel, 1891	05.06	5	p., sy.	Ba.
		05.06	1		Vu.
		05.06	1		Da.1.
9	*Cryptocephalus (Cryptocephalus) biguttatus* (Scopoli, 1763)	05.06	7	p., sy.	Ba.
		05.06	1		Da.1.
10	*Cryptocephalus (Cryptocephalus) violaceus* Laicharting, 1781	05.06	2	m., sy.	Ba.
		05.06	1		Vu.

Table 1 (continued)

11	*Cryptocephalus (Cryptocephalus) bipunctatus* (Linnaeus, 1758)	05.06 05.06 05.06 19.06	1 5 1 2	p., sy.	Ba. Vu. Da.1. Pa.
12	*Cryptocephalus (Cryptocephalus) turcicus* Suffrian, 1847	05.06	5	p., eu.	Ba.
13	*Cryptocephalus (Cryptocephalus) moraei* (Linnaeus, 1758)	05.06 05.06 05.06	1 1 2	o., pr.	Ba. Vu. Da.1.
14	*Cryptocephalus (Cryptocephalus) flavipes* Fabricius, 1781	05.06	12	p., sy.	Vu.
15	*Cryptocephalus (Cryptocephalus) aureolus* Suffrian, 1847	05.06	5	p., eu.	Da.1.
16	*Cryptocephalus (Cryptocephalus) vittatus* Fabricius, 1775	05.06 19.06	1 1	o., pr.	Da.1. De.
17	*Cryptocephalus (Cryptocephalus) virens* Suffrian, 1847	19.06	2	o., sy.	Da.2.
18	*Cryptocephalus (Burlinius) bilineatus* (Linnaeus, 1767)	05.06 19.06	5 1	m., pr.	Ba. Da.3.
19	*Cryptocephalus (Burlinius) exiguus* Schneider, 1792	05.06	1	o., sy.	Da.1.
20	*Cryptocephalus (Burlinius) carpathicus* J. Frivaldsyky, 1883	05.06	4	m., sy.	Da.1.
21	*Cryptocephalus (Burlinius) connexus* Olivier, 1808	19,06	2	o., sy.	Da.3.
	III. Chrysomelinae, Latreille, 1802 **(104)***				
22	*Chrysolina (Chalcoidea) marginata* (Linnaeus, 1758)	05.06 05.06 19.06	6 2 1	o., pr..	Ba. Vu. Pa.
23	*Plagiodera versicolora* (Laicharting, 1781)	19.06	1	o., sy.	Da.2.
24	*Chrysomela (Chrysomela) tremulae* Fabricius, 1787	05.06	1	o., sy.	Da,1.
	IV. Galerucinae, Latreille, 1802 **(33)***				
25	*Galeruca (Galeruca) tanaceti* (Linnaeus, 1758)	05.06 05.06 05.06	7 4 2	p., eu.	Ba. Vu. Da.1.
26	*Galeruca (Galeruca) pomonae* Scopoli, 1763	05.06 19.06	1 1	p., pr.	Ba. De.
27	*Luperus xanthopoda* Schrank, 1781	19.06	1	p., eu.	Pa.
	V. Halticinae, Newman, 1834 **(240)***				

Table 1 (continued)

28	*Phyllotreta armoraciae* (Koch, 1803)	05.06	1	o., pr.	Ba.
		05.06	1		Vu.
29	*Aphthona lacertosa* Rosenhauer, 1847	05.06	6	o., pr.	Ba.
		05.06	7		Vu.
30	*Aphthona caerulea* (Geoffroy, 1785)	05.06	1	m., pr.	Ba.
31	*Aphthona ovata* Foudras, 1861	05.06	2	o., pr.	Ba.
32	*Longitarsus (Longitarsus) lycopi* (Foudras, 1860)	05.06	1	o., pr.	Da.1.
33	*Longitarsus (Longitarsus) pellucidus* (Foudras, 1860)	19.06	1	m., pr.	Da.2.
34	*Asiorestia ferruginea* (Scopoli, 1763)	05.06	1	p., pr.	Ba.
		05.06	3		Da.1.
		19.06	1		Da.2.
		19.06	1		Da.3.
		19.06	1		De.
35	*Asiorestia transversa* (Marsham, 1802)	19.06	2	p., pr.	Pa.
		19.06	1		Da.3.
36	*Asiorestia cyanescens* (Duftschmid, 1825)	19.06	1	p., pr.	Da.3.
37	*Crepidodera aurata* (Marsham, 1802)	05.06	13	o., sy.	Ba.
		05.06	14		Da.1.
		19.06	4		Da.2.
38	*Crepidodera aurea* Geoffroy, 1875	05.06	13	o., sy.	Da.1.
39	*Chaetocnema (Tlanoma) clorophana* (Duftschmid, 1825)	05.06	5	o., pr.	Da.1.
		19.06	1		Da.2.
40	*Chaetocnema (Tlanoma) heikertingeri* Ljubiskev, 1963- Gruev, Tomov, Merkl (1987)	19.06	1	p., pr.	Da.3.
41	*Dibolia (Dibolia) cyanoglosyi* (Koch, 1802)	05.06	1	o., pr.	Da.1.
	VI: Cassidinae, Gyllenhal, 1813 **(30)***				
42	*Hypocassida subferruginea* (Schrank, 1776)	19.06	1	o., pr.	Da.3.
43	*Cassida (Cassida) pannonica*, Suffrian, 1844	05.06	1	m., pr.	Ba.
		05.06	1		Vu.
44	*Cassida (Cassida) rubiginosa* O.F. Muler, 1776	05.06	1	o., pr.	Ba.
45	*Cassida (Cassida) prasina* Illiger, 1798	05.06	1	o., pr.	Ba.
46	*Cassida (Cassida) lineola* Creutzer, 1799	05.06	1	m., pr.	Da.1.
47	*Cassida (Cassida) vibex* Linnaeus, 1767	19.06	1	p., pr.	De.

Table 1 (continued)

48	*Cassida (Mionycha) subreticulata* Suffrian, 1844	19.06	1	o., pr.	Pa.
49	*Cassida (Mionycha) margaritacea* Schaller, 1783	19.06	1	m., pr.	De.

Abreviations: **Crt. No**. = current number; **No. ind**. = number of individuals; **Ba.** = a mown moeadow in Bădeşti village; **Da.1.** = a large glade in a decidous forest, not mowed or grazed at the collection dates, in Dăbâca village; **Da.2**. = a pasture in an abandoned meadow, moderately grazed at the collection dates, in Dăbâca village; **Da.3**. = an intensively grazed pasture neighbouring a deciduous forest, in Dăbâca village; **De**. = a moderately grazed pasture, not far from a deciduous forest, in Deuş village; **Pa.** = a hay meadow extended to an oak forest edge, partially mown and moderately grazed at the collection dates, in Pâglişa village; **Vu.** = an extended meadow, neighbouring a large oak forest, partially mown and grazed at the collection dates, in Vultureni village area.
*- represent the number of species mentioned in Romanian fauna (Maican, 2005).
o= oligophagous species; p= polyphagous species; m= monophagous species;
pr= praticol; sy.= sylvicol; eu.= euritope.

2. The distribution of the number of species according to the subfamilies (Fig. 1.) indicates the domination of Cryptocephalinae and Halticinae, subfamilies which have many xero-mesophilous species, these indicating also the predominant character of the grassland habitats in the investigated area.

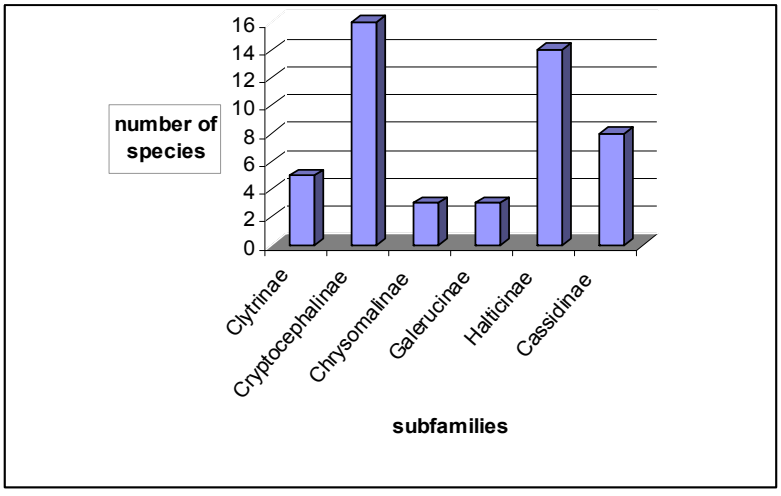

Figure 1. The distribution of the number of leaf-beetle species caught in June 2014 in Eastern Cluj Hills Nature 2000 Site, according to the subfamilies.

In 2014 we found a higher number of species belonging to the Cryptocephalinae subfamily, compared to the number of species belonging to the Halticinae subfamily. Cryptocephalinae species prefere high grasses and compact vegetation, whereas Halticinae are rather found in low and discontinuous vegetation. Compared to the year 2000 (Crisan *et al*. 2000), when Halticinae were dominant, the predominance of Cryptocephalinae in 2014, indicates the evolution of the physical structure of grassy vegetation from a low and discontinuous one, resulted from intensive grazing, to a high and continuous, resulting from a moderate grazing.

3. The distribution of the number of species according to the sampling areas and habitats (Fig. 2.) indicate that in the areas Bădeşti and Dăbâca 1, more than a double number of species were present, compared with Dăbâca 2, Dăbâca 3, Deuş, and Pâglişa, while at Vultureni a mean situation was registered. Considering the fact that the investigated habitats do not differ significantly in pedo-climate conditions (all are meadows on tilted areas in the proximity of a forest), we explain this result as a consequence of the different land use method of these habitats (hay meadow versus grazed pastures). This result indicates also that the leaf-beetles could be used as indicator group of the degree of human impact in the grassland habitats. Because it is a phytophagous group it is sensitive to the changes in the composition and physical structure of the vegetation.

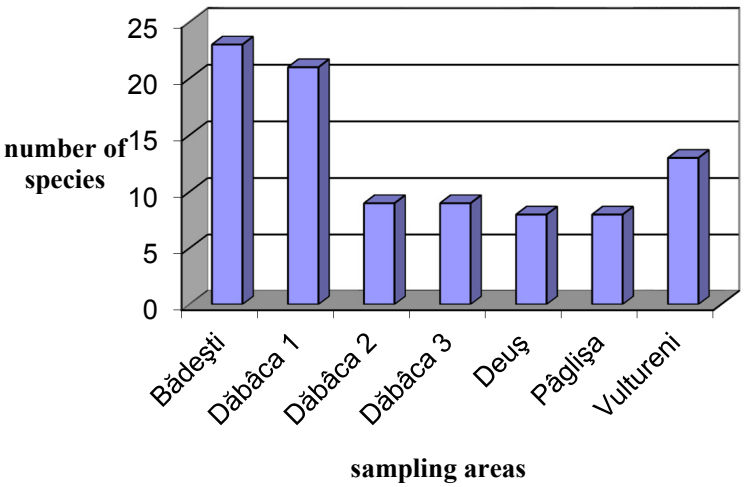

Figure 2. The distribution of the number of leaf-beetles species recorded in June 2014 in Eastern Cluj Hills Nature 2000 Site, according to the sampling areas.

4. Many of the recorded species, like: *Labidostomis longimana* (26 individuals), *Smaragdina aurita* (20 individuals) (Clytrinae); *Cryptocephalus hyppochoeridis* (30 individuals) (Cryptocephalinae); *Galeruca tanaceti* (13 individuals) (Galerucinae); *Aphthona lacertosa* (13 individuals) and *Crepidodera aurata* (31 individuals) (Halticinae) were dominant in the investigated areas. These species were dominant also in the investigations from the year 2000 (Crisan et al., 2000), being species well adapted to the ecological conditions of the Eastern Cluj Hills Site. Other species like: *Cryptocephalus turcicus, C. virens, C. carpathicus* (Cryptocephalinae); *Chrysomela tremulae* (Chrysomelinae); *Asiorestia cyanescens, Dibolia cyanoglosi* (Halticinae) and *Cassida subreticulata* (Cassidinae) are rare and endangered species for the investigated zone.

Otherwise, the situation of rare and endangered species is different, comparing with the investigations from the year 2000: The species *Cryptocephalus aureolus* and *C. schneideri*, found rarely in Vultureni and Dăbâca areas in 2000, were not present in the investigations made in 2014 in Eastern Cluj Hills Site, whereas other three species of *Cryptocephalus* (mentioned above) have penetrated the zone. The species *Phyllotreta armoraciae*, mentioned as rare (1 individual at Bobâlna) in the investigations from the year 2000, have spread to Bădeşti and Vultureni in 2014, and could not be considered as rare any more. A similar situation was illustrated by *Chaetocnema clorophana* (1 individual at Bobâlna in 2000), that extended its area to Dăbâca in 2014, and it is not very rare any more in this area.

Conclusions

In the area "Eastern Cluj Hills, Natura 2000 Site" we identified 49 leaf-beetle species from 6 subfamilies.

The species registered indicate both the xero-mesophilous character of the investigated area and the evolution of the physical structure of the grassy vegetation from low and discontinuous to high and continuous, as a result of a change in the intensity of grazing.

Different methods of land use were reflected in the distribution of leaf-beetles, these being an important indicator of human impact in grassland habitats.

Certain leaf-beetle species, dominant in the area, are better adapted to the area's conditions, whereas others, registered as rare and endangered, are scarce adapted to these conditions.

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