

## Study on leaf-beetles (Coleoptera: Chrysomelidae) in the area “Vălenii de Mureș”, Mureș county, Romania

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### Summary

An amount of 42 leaf-beetles species, from 8 subfamilies were registered in Vălenii de Mureș zone, in the area of two islands limited by Mureș river branches, in which different types of habitats were investigated. Two subfamilies, Chrysomelinae and Halticinae had significantly great number of species, this proving the dominant mezo-hygrophilous character of the area. Five ecological indices were calculated for each species. Some rare and endangered species are mentioned.

**Keywords:** Leaf-beetles, Mureș, Romania

The studied area belongs to the upper Mureș basin and constitutes a depression situated nearby the Gurghiului Mountains. The flat relief has determined in the area a slower flow of the river, with many meanders, and the formation of some islands between the river branches. Two of these islands, situated in the vicinity of Vălenii de Mureș village constituted the area of the study described in the present paper. We mention that the leaf-beetles were few studied in the country, till the last decade, (BOBĂRNAC 1974; BALOG & AL. 1997; CRIȘAN 1993A, B, 1994, 1995, 2004, 2006A, B; CRIȘAN & TEODOR 1994, 2003, 2005; CRIȘAN & BONEA 1995; CRIȘAN & DRUGUȘ 2001; CRIȘAN & AL. 1998, 1999, 2000, 2003; FLECK 1905; GRUEV & AL. 1993; IENIȘTEA 1974; IENIȘTEA & NEGRU 1975; KONNERT-IONESCU 1963, MAICAN & SERAFIM 2001; MARCU 1927, 1928, 1936, 1957; NEGRU 1968, NEGRU & ROȘCA 1967; ROȘCA 1974, 1976; SEIDLITZ 1891; SZEL & AL., 1995), and no information on this beetle family is known referring to the area here discussed.

### Material and methods

The research was carried out between April - July 2007 in the area of two islands of Mureș river, named „the big island” and „the small island”, both with a surface of about 11 ha. The island’s vegetation is mezo-hygrophilous to hygrophilous one, with tree species as willow (*Salix* sp.), birch (*Betula* sp.), poplar (*Populus* sp.), alder (*Alnus* sp.) and false accacia (*Robinia pseudaccacia*), but also grasses and herbs as: *Potentilla*, *Veronica*, *Galium*, *Luzula*, *Trifolium*, *Agrostis*, *Phragmites*, *Chrysanthemum*, *Centaurea*, *Oenothera*, *Geranium*, *Urtica*,

*Cirsium*, *Polygonum*, *Calamagrostis*, *Tanacetum*, *Dipsacus*, *Artemisia*, *Saponaria*, *Lathyrus* and other genera. There were also some agricultural crops. We made observations and took samples in five types of habitats:

A hay-field situated in the middle of the big island, with a vegetation dominated by grasses mixed with *Trifolium repens*, *Geranium pratense*, *Artemisia vulgaris* and other herbs.

Clusters of trees and bushes of *Salix*, and *Betula* species, as well as *Robinia pseudaccacia*.

A riverside coppice, area situated in the vicinity of Mureș river branches, with sparse trees of *Salix*, *Populus* and *Alnus* species, so as a better represented hygrophilous layer composed by *Eupatorium cannabinum*, *Phragmites communis*, *Echynocystis lobata*, *Atropa beladonna*, *Impatiens glandulifera* and other herbs and grasses.

Weeds bordering the agricultural crops, composed by *Artemisia vulgaris*, *Saponaria officinalis*, *Rubus caesius*, *Silene vulgaris*, *Dipsacus laciniatus*, *Pelargonium vulgare* and other weeds and grasses.

Isolated trees of *Salix* sp., *Populus* sp., *Alnus* sp., and *Robinia pseudaccacia*, situated in the middle of the big island.

In the small island two habitats were considered:

A glade in the middle of this island, with *Festuca pallens*, *Althaea hirsuta*, *Calamagrostis epigeios*, *Fumaria officinalis*, *Chelidonium majus*, *Dipsacus fullnum*, *Lolium perene* and other grasses and herbs.

Clusters of trees and bushes dominated by *Salix* sp., *Prunus spinosa*, *Corylus avellana*, *Popu-*

*lua alba*, *Betula verrucosa*, *Robinia pseudaccacia* and *Alnus glutinosa*.

Insects were collected by sweepnet with an amount of 25 sweeps (about 10 m<sup>2</sup>) per sample. In the case of trees we used the entomological umbrella. Collected material was put in 70% alcohol and labeled. The insects were dried before the identification in order to display the natural colours. Identifications were made with the stereo-microscope using specific literature (KASZAB, 1962-1971; KIPPENBERG & DOBERL, 1994; MOHR, 1966; PANIN, 1951; PETRI, 1912; WARKALOWSKY, 1993, 2003)

Registered data were statistically analyzed with ecological indexes as: absolute abundance (A.A), as a percent ratio of the number of individuals of a species and the number of the samples taken in an area; the dominance (D.), as a percent ratio between the number of individuals of a species and the total number of leaf-beetle individuals caught in an

analyzed habitat; the frequency (F.), as a percent ratio between the number of samples in which a species is present and the total number of samples taken in a habitat; the constancy (C.), as an expression of the frequency values, in which F= 0-25%- accidental species, F=25.1-50%- accessory species, F= 50.1-75%- constant species, F= 75.1-100%- euconstant species; the biotope index (W.), as a multiply of the constancy and the domination of a species, indicating the position of each species in an analyzed biocenosis.

Data were grouped in complex taxonomical tables.

### Result and discussion

An amount of 42 leaf-beetles species from 8 subfamilies were registered in the studied area (Table 1.).

**Table 1**

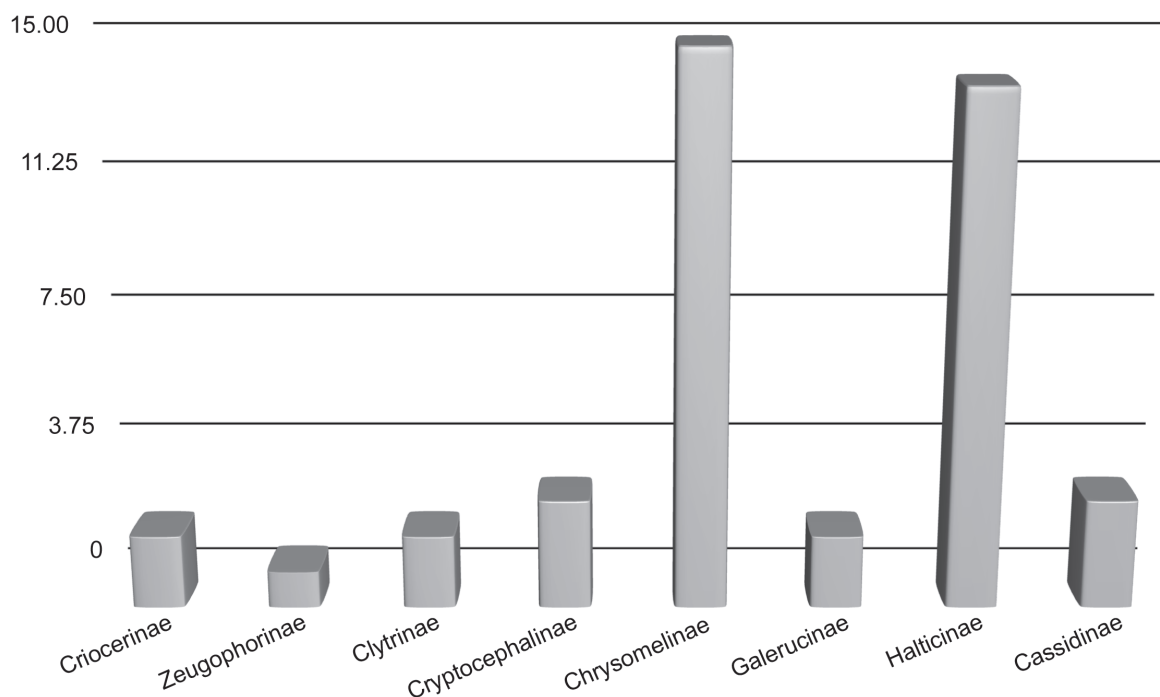
List of the leaf-beetles species captured in „Vălenii de Mureș” area and calculated ecological indexes

No.	Subfamily, species	Ecol. char.	No. ind	C. %	D. %	F. %	A. %	W.
	<b>Criocerinae (Latreille, 1807)</b>							
1	<i>Oulema (Oulema) melanopus</i> (Linnaeus, 1758)	mezo-xer.	3	1.43	0.36	1.34	0.38	0.014
2	<i>Oulema (Haspidolema) tristis</i> (Herbst, 1786)	mezo-xer.	1	0.48	0.12	0.67	0.13	0.005
	<b>Zeugophorinae (Boving et. Craighead, 1931)</b>							
3	<i>Zeugophora flavicollis</i> (Marsham, 1802)	mezo-philous	2	0.95	0.24	0.67	0.83	0.009
	<b>Clytrinae Kirby, 1837</b>							
4	<i>Clytra laeviscula</i> (Ratzenburg, 1837)	mezo-philous	5	2.38	0.59	0.59	2.08	0.045
5	<i>Smaragdina flavicollis</i> (Charpentier, 1825)	mezo-philous	1	0.48	0.12	0.67	0.42	0.005
	<b>Cryptocephalinae Gyllenhal, 1813</b>							
6	<i>Pachybrachys sinuatus</i> Mulsant et Rey, 1859	mezo-philous	4	1.95	0.47	2.67	1.67	0.018
7	<i>Cryptocephalus (Cryptocephalus) decemmaculatus</i> (Linnaeus, 1758)	mezo-hygr.	2	0.95	0.24	1.34	0.83	0.009
8	<i>Cryptocephalus (Burlinius) ocellatus</i> Drapiez, 1819	mezo-hygr.	6	2.86	0.71	3.34	2.50	0.054
	<b>Chrysomelinae Latreille, 1802</b>							
9	<i>Leptinotarsa decemlineata</i> (Say, 1824)	mezo-philous	2	0.95	0.24	3.81	0.25	0.009
10	<i>Chrysolina (Fastuolina) fastuosa</i> (Scopoli 1763)	mezo-hygr.	1	0.48	0.12	3.81	0.13	0.005
11	<i>Chrysolina (Euchrysolina) graminis</i> (Linnaeus 1758)	mezo-hygr.	1	0.48	0.12	3.81	0.13	0.005

No.	Subfamily, species	Ecol. char.	No. ind	C. %	D. %	F. %	A. %	W.
12	<i>Chrysolina (Menthastriella) herbacea</i> (Duftschmid, 1825)	mezo-hygr.	1	0.48	0.12	3.81	0.13	0.005
13	<i>Chrysolina (Erythrochrysa) polita</i> (Linnaeus, 1783)	mezo-hygr	4	1.90	0.47	7.62	0.50	0.018
14	<i>Chrysolina (Sphaeromela) varians</i> (Schaller, 1783)	mezo-philous	1	0.48	0.12	3.81	0.13	0.005
15	<i>Gastrophysa viridula</i> (De Geer, 1775)	mezo-philous	3	1.43	0.36	7.62	0.38	0.027
16	<i>Phaedon (Phaedon) cochleariae</i> (Fabricius, 1792)	mezo-hygr.	6	1.43	0.36	7.62	0.38	0.027
17	<i>Plagioderia versicolora</i> (Lai-charting, 1781)	mezo-philous	93	62.4	15.5	19.1	54.6	2.960
18	<i>Chrysomela (Stricherus) vigin-tipunctata</i> (Scopoli, 1763)	mezo-hygr.	15	7.14	1.78	11.4	6.25	0.203
19	<i>Chrysomela (Pachylina) collaris</i> (Linnaeus, 1758)	mezo-hygr.	1	0.48	0.12	3.81	0.42	0.005
20	<i>Chrysomela (Chrysmela) populi</i> Linnaeus, 1758	mezo-hygr.	2	0.95	0.30	1.34	0.83	0.009
21	<i>Phratora (Phratora) tibialis</i> (Suffrian 1851)	mezo-philous	57	27.1	6.76	19.1	23.8	1,228
22	<i>Phratora (Phratora) vitellinae</i> (Linnaeus, 1758)	mezo-philous	53	25.2	6.29	15.2	22.1	0.958
23	<i>Phratora (Chaeroceta) vulgattissima</i> (Linnaeus, 1758)	mezo-philous	26	18.1	4.51	7.62	15.8	0.687
	<b>Galerucinae Latreille, 1802</b>							
24	<i>Galerucella (Neogalerucella) lineola</i> (Fabricius, 1781)	mezo-philous	117	55.7	13.9	11.4	48.8	1.586
25	<i>Lochmea capreae</i> (Linnaeus, 1758)	mezo-philous	1	0.48	0.12	0.67	0.42	0.005
	<b>Halticinae Newman, 1834</b>							
26	<i>Altica oleracea</i> (Linnaeus, 1758)	mezo-philous	28	3.50	3.32	15.2	13.3	0.506
27	<i>Altica quercetorum</i> Foudras, 1860	mezo-philous	4	1.67	0.47	7.62	1.67	0.036
28	<i>Longitarsus (Longitarsus) rubellus</i> (Foudras 1860)	mezo-philous	1	0.48	0.12	3.81	0.13	0.005
29	<i>Crepidodera aurata</i> (Marsham 1802)	mezo-hygr.	212	100	25.2	22.9	88.3	5.748
30	<i>Podagrica fuscicornis</i> (Linnaeus, 1767)	mezo-philous	1	0.48	0.12	3.81	0.13	0.005
31	<i>Mantura chrysanthemii</i> (Koch, 1803)	mezo-philous	1	0.48	0.12	3.81	0.13	0.005
32	<i>Chaetocnema (Tlanoma) tibialis</i> (Illiger, 1807)	mezo-philous	1	0.48	0.12	3.81	0.13	0.005
33	<i>Chaetocnema (Tlanoma) hortensis</i> (Geoffroy, 1785)	mezo-philous	3	1.43	0.36	7.62	0.38	0.027
34	<i>Chaetocnema (Tlanoma) schefferi</i> (Kutschera, 1864)	mezo-philous	9	4.29	1.07	7.62	1.13	0.081
35	<i>Chetocnema (Tlanoma) semicoerulea</i> (Koch, 1803)	mezo-hygr.	115	54.8	13.6	19.1	47.9	2.598
36	<i>Chaetocnema (Chaetocnema) aridula</i> (Gyllenhal, 1827)	mezo-philous	1	0.48	0.12	3.81	0.13	0.005

No.	Subfamily, species	Ecol. char.	No. ind	C. %	D. %	F. %	A. %	W.
37	<i>Chaetocnema (Chaetocnema) confusa</i> (Boheman, 1851)	mezo-hygr.	1	0.48	0.12	3.81	0.13	0.005
38	<i>Chaetocnema (Chaetocnema) semicoerulea</i> (Kutschera, 1864)	mezo-hygr.	1	0.48	0.12	3.81	0.13	0.005
39	<i>Psylliodes (Psylliodes) chrysocephala</i> (Linnaeus, 1758)	mezo-philous	1	0.48	0.12	3.81	0.13	0.005
<b>Cassidinae Gyllenhal, 1813</b>								
40	<i>Cassida (Cassida) pannonica</i> Suffrian 1844	mezo-philous	5	2.38	0.59	2.00	0.63	0.045
41	<i>Cassida (Cassida) vibex</i> Linnaeus 1767	mezo-hygr.	3	1.43	0.45	1.25	0.38	0.027
42	<i>Cassida (Cassida) rubiginosa</i> O.F.Muler, 1776	mezo-hygr.	1	0.48	0.12	3.81	0.13	0.005

**Abbreviations:** mezo-hygr.=mezo-hygrophilous; cr.nr.= current number; Nr. ind.= number of individuals; C.,D.,F., A., W. =ecological indexes as described in „material and methods”



**Fig.1.** Diagram of leaf-beetle subfamilies concerning the number of species identified in Vălenii de Mureș area

Two subfamilies, Chrysomelinae and Alticinae were the best represented ones, concerning both the number of species and the number of individuals here registered (Fig.1.) Most of the species are mezophilous ones, living on bushes and trees. From these, *Crepidodera aurata* is a characteristic constant species as revealed by the calculated byotope index ( $W=5.74$ ). As the calculated constancy index proves, other three species were also constant: *Chaetocnema semicoerulea*, *Plagioderia versicolora* and *Galerucella lineola*, while *Phratora tibialis*

and *Phratora vitellinae* were accessory species and the rest of 36 species were accidental ones.

The dominance analyse reveals that the species *Crepidodera aurata*, *Plagioderia versicolora*, *Chaetocnema semicoerulea* and *Galerucella lineola* are eudominant; *Phratora tibialis* and *Phratora vittellinae* are dominant; *Phratora vulgatissima* and *Altica oleracea* are subdominant; *Chrysomela vigintipunctata* and *Chaetocnema schaefferi* are recedent, and other 32 leaf-beetles species are subrecedent, having low to 1% values of dominance.

Referring to the distribution of leaf-beetle species in habitat types (Table 2), the biotops „hay-land”, with 18 species and „cluster trees and bushes”, with 15 species showed the highest leaf-beetle biodiversity.

Some of the registered species are rare and endangered in the Romanian fauna: *Smaragdina flavicollis*, *Lochmea capreae*, *Zeugophora flavicollis* (extremely rare one), *Phratora tibialis*, *Psylliodes chrysocephala*, *Mantura chrysanthemii*, *Longitar-*

**Table 2**

Distribution of the leaf-beetles species in the investigated habitats

No.	Sub-family, species	the big island						small island		
		N.i	1	2	3	4	5	N.i	1	2
<b>Criocerinae (Latreille, 1807)</b>										
1	<i>Oulema (Oulema) melanopus</i> (Linnaeus, 1758)	3	-	-	-	3	-	-	-	-
2	<i>Oulema (Haspidolema) tristis</i> (Herbst, 1786)	1	1	-	-	-	-	-	-	-
<b>Zeugophorinae (Boving &amp; Craighead, 1931)</b>										
3	<i>Zeugophora flavicollis</i> (Marsham, 1802)	2	-	2	-	-	-	-	-	-
<b>Clytrinae Kirby, 1837</b>										
4	<i>Clytra laeviscula</i> (Ratzenburg, 1837)	5	-	1	4	-	-	-	-	-
5	<i>Smaragdina flavicollis</i> (Charpentier, 1825)	1	-	-	1	-	-	-	-	-
<b>Cryptocephalinae Gyllenhal, 1813</b>										
6	<i>Pachybrachys sinuatus</i> Mulsant et Rey, 1859	4	-	4	-	-	-	-	-	-
7	<i>Cryptocephalus (Cryptocephalus) decemmaculatus</i> (Linnaeus, 1758)	2	-	2	-	-	-	-	-	-
8	<i>Cryptocephalus (Burlinius) ocellatus</i> Drapiez, 1819	6	-	5	-	-	1	-	-	-
<b>Chrysomelinae Latreille, 1802</b>										
9	<i>Leptinotarsa decemlineata</i> (Say, 1824)	2	-	-	-	2	-	-	-	-
10	<i>Chrysolina (Fastuolina) fastuosa</i> (Scopoli 1763)	1	1	-	-	-	-	-	-	-
11	<i>Chrysolina (Euchrysolina) graminis</i> (Linnaeus 1758)	1	1	-	-	-	-	-	-	-
12	<i>Chrysolina (Menthastriella) herbacea</i> (Duftschmid, 1825)	1	1	-	-	-	-	-	-	-
13	<i>Chrysolina (Erythrochrysa) polita</i> (Linnaeus, 1783)	3	-	-	3	-	-	-	-	-
14	<i>Chrysolina (Sphaeromela) varians</i> (Schaller, 1783)	1	-	-	1	-	-	-	-	-
15	<i>Gastrophysa viridula</i> (De Geer, 1775)	1	-	-	1	-	-	2	-	2
16	<i>Phaedon (Phaedon) cochleariae</i> (Fabricius, 1792)	3	1	-	-	2	-	1	1	-
17	<i>Plagioderma versicolora</i> (Laicharting, 1781)	99	-	61	18	-	20	32	6	26
18	<i>Chrysomela (Stricherus) vigintipunctata</i> (Scopoli, 1763)	9	-	8	-	-	1	6	-	6
19	<i>Chrysomela (Pachylina) collaris</i> (Linnaeus, 1758)	1	-	-	-	-	1	-	-	-
20	<i>Chrysomela (Chrysmela) populi</i> Linnaeus, 1758	2	-	2	-	-	-	-	-	-

No.	Sub-family, species	the big island					small island			
		N.i	1	2	3	4	5	N.i	1	2
21	<i>Phratora (Phratora) tibialis</i> (Suffrian 1851)	37	-	32	2	-	3	20	5	15
22	<i>Phratora (Phratora) vitellinae</i> (Linnaeus, 1758)	40	-	24	5	-	11	13	-	13
23	<i>Phratora (Chaeroceta) vulgatissima</i> (Linnaeus, 1758)	26	-	18	6	-	2	12	-	12
<b>Galerucinae Latreille, 1802</b>										
24	<i>Galerucella (Neogalerucella) lineola</i> (Fabricius, 1781)	70	-	53	9	-	8	49	1	47
25	<i>Lochmea capreae</i> (Linnaeus, 1758)	1	-	-	-	-	1	-	-	-
<b>Halticinae Newman, 1834</b>										
26	<i>Altica oleracea</i> (Linnaeus, 1758)	27	15	-	3	9	-	1	1	-
27	<i>Altica quercetorum</i> Foudras, 1860	4	-	3	-	-	1	-	-	-
28	<i>Longitarsus (Longitarsus) rubellus</i> (Foudras 1860)	1	1	-	-	-	-	-	-	-
29	<i>Crepidodera aurata</i> (Marsham 1802)	185	2	124	35	-	24	27	5	22
30	<i>Podagrica fuscicornis</i> (Linnaeus, 1767)	1	1	-	-	-	-	-	-	-
31	<i>Mantura chrysanthemi</i> (Koch, 1803)	1	1	-	-	-	-	-	-	-
32	<i>Chaetocnema (Tlanoma) tibialis</i> (Illiger, 1807)	1	1	-	-	-	-	-	-	-
33	<i>Chaetocnema (Tlanoma) hortensis</i> (Geoffroy, 1785)	3	2	-	-	1	-	-	-	-
34	<i>Chaetocnema (Tlanoma) schefferi</i> (Kutschera, 1864)	9	6	-	-	3	-	-	-	-
35	<i>Chaetocnema (Tlanoma) semicoerulea</i> (Koch, 1803)	105	-	71	23	-	11	10	3	7
36	<i>Chaetocnema (Chaetocnema) aridula</i> (Gyllenhal, 1827)	1	1	-	-	-	-	-	-	-
37	<i>Chaetocnema (Chaetocnema) confusa</i> (Boheman, 1851)	1	1	-	-	-	-	-	-	-
38	<i>Chaetocnema (Chaetocnema) semicoerulea</i> (Kutschera, 1864)	1	1	-	-	-	-	-	-	-
39	<i>Psylliodes (Psylliodes) chrysocephala</i> (Linnaeus, 1758)	-	-	-	-	-	-	1	-	1
<b>Cassidinae Gyllenhal, 1813</b>										
40	<i>Cassida (Cassida) pannonica</i> Suffrian 1844	5	4	-	-	1	-	-	-	-
41	<i>Cassida (Cassida) vibex</i> Linnaeus 1767	3	1	-	-	2	-	-	-	-
42	<i>Cassida (Cassida) rubiginosa</i> O.F.Muler, 1776	1	1	-	-	-	-	-	-	-

**Note:** the number of the investigated habitats are the same as in „material and methods”; cr.nr.= current number; N.i= number of caught individuals.

*rubellus*, *Chaetocnema subcoerulea*, the studied area constituting a suitable refuge for these.

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Received: 24.11.2007  
 Accepted: 14.12.2007  
 Printed: 28.10.2008