Studies on leaf-beetles (Coleoptera, Chrysomelidae) from the middle Arieş river basin (Câmpeni-Buru area)

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Rezumat

Cercetări asupra crizomelidelor (Coleoptera , Chrysomelidae) din aria bazinului mijlociu al Arieşului

Într-o cercetare efectuată în cursul anului 2003, utilizând şi material colectat anterior (1998-2002), s-au identificat 140 de specii de crizomelide din 44 de genuri şi 9 subfamilii, în zona bazinului mijlociu al Arieşului. Cel mai bine reprezentate au fost subfamiliile Alticinae (46 specii), Chrysomelinae (39 specii) şi Cryptocephalinae (22 specii), iar dintre genuri, *Cryptocephalus* (20 specii), *Chrysolina* (15 specii) şi *Cassida* (11 specii). Cele mai multe dintre genurile prezente au avut o singură specie prezentă (20 genuri), sau două specii (9 genuri). Marea biodiversitate a crizomelidelor din zonă se datorează condiţiilor pedoclimatice şi fitocenologice foarte variate existente acolo. S-a remarcat prezenţa, cu număr relativ mare de specii, a unor genuri mai rare pentru Transilvania, cât şi existenţa a multe specii rare şi foarte rare, pe care le considerăm periclitate, semnalând necesitatea unor măsuri de protecţie ecologică a zonei cercetate.

Keywords: leaf-beetles, middle Arieş river basin, faunistics, ecology

Studies on this beetle group in Romanian fauna are scarce, reflected in a menner by some old works (Seidlitz 1891; Fleck 1905; Petri 1912; Marcu 1927, 1928, 1936), as well as by other works from the last half of the twentieth century (Ieniştea 1969, 1974, 1975; Konnert-Ionescu 1963; Marcu 1957; Negru 1968; Negru and Roşca 1967; Roşca 1973, 1974, 1976), in which are treated, frequently, many beetle groups.

A specify research on leaf-beetles of the Romanian fauna has begun in the last decade of the twentieth century (Gruev et all. 1993, Crişan 1993, 1994, 1995; Crişan and Teodor 1994, 1996; Crişan and Bonea, 1995; Crişan and Druguş 2001; Crişan et all., 1998, 1999, 2000; Szel et all., 1995; Ilie 1999; Maican and Serafim, 2001), but the group is still far from a good knowledge, concerning a lot of faunistical, ecological and zoogeographical aspects.

The Arieş river basin, area in which are situated also the present researches, has no been studied till now concerning the above enumerated aspects. Durring the year 2003, as a continuation of previous researches, made in the upper Arieş river basin (Crişan and Teodor 2003), we studied the Arieş middle basin, downstream Câmpeni town to Buru village, an extended area with various ecosystems, begining to montainous ones to others typical for hills and meadows. The orography of the area contains different formations dominated by tilted zones with high hills and deep valies, with strong to moderate tilted slopes, very different orientated. The most part of the area is covered by diverse vegetation, represented by foliaceous forests, meadows, glades, with both mono and dicotyledonous, mezophilous to xerophilous, plants. Proximate to the valies, the vegetation has a mezohygrophilous to hygrophilous character, in any places more influenced by the human activities.

Material and methods

Leaf-beetles were collected along Arieş river valley in the vecinity of the localities or between its, as well as on the most important valies of the middle Arieş river basin as: Bistrei Valley, Poşaga Valley, Runcului Valley, Ponor valley, Vadului Valley. We taked samples in all the representative types of ecosystems in that zones.

Description of the collecting points and ecosystems:

I. Bistrei Valley. Bistra is the first valley tributary to Arieş river on left side downstream Câmpeni town. Samples were taken in two ecosystems:

a. A hygrophilous lawn nearby a forest, on the right side of the valley, with North-Eastern exposition. The dominant plants were species of *Trifolium*, *Mentha*, *Carex*, and some hygrophylous herbs.

b. A *Salicetum* association, with a best represented bed of weeds, dominating *Urtica dioica*.

II. Bistra village.

a. An *Alneto-Salicetum* association with a better represented bed of herbs and weeds. From here we sampled only by Barber traps.

III. Gârde village. Samples were taken on the slopes from the left side of Arieş river.

a. A *Fagetum* association, fotrest on a Southern exposed slope, a very tilted area with *Fagus sylvatica, Corylus avellana* and *Crataegus monogyna* as wooden vegetation, and a well represented bed of herbs and weeds.

b. A *Populneto-Salicetum* association nearby the river, with hygrophilous herbs and weeds.

IV. Lupşa, village situated in the foliaceous forests area.

a. A *Fageto-Quercetum* association on a Southern exposed slope in the left side of the river, with well represented beds of bushes, weeds and herbs mostly in the glades where *Corylus avellana, Salix caprea, Urtica dioica*, species of *Rumex* etc. were dominant.

V. Lupşa Valley, village situated on the left side of Arieş river, to Lupşa valley mouth, where it is a large river meadow.

a. An *Alnetum* association on the left side of the river, with a bed of weeds represented mostly by *Urtica dioica* and species of *Mentha*.

VI. Arieşului Meadow.

a. A pasture nearby the river side, with mezo-hygrophilous vegetation and rare bushes and trees.

VII. Brăzeşti, village situated in a depression area, with a large ecological diversity. Samples were taken on the left side of Arieş river and also in a point on the right side.

a. A *Pineto-Fageto-Carpinetum* association on the left side of the river, a North-Eastern exposed slope at approximately 480 m altitude. Except the indicatory species, this association contains also *Corylus avellana*, *Crataegus monogyna*, *Alnus incana* and *Salix caprea*. The herbous and weeden bed was also representativ.

b. A *Salicetum* association nearby the river, with species of *Salix, Corylus, Fagus*, as well as *Rumex, Equisetum, Urtica* and some hygrophilous herbs.

c. A pasture nearby Brăzeşti village, at 460 m altitude on a strong tilted slope South-Western exposed. The vegetation was represented by mezophilous herbs and weeds, with rare bushes of *Corylus, Crataegus, Fagus, Betula* and *Salix caprea*. The pasture is bordered, nearby the tip of the hill, by a foliaceous forest.

d. A lawn situated in the first half of the same hill, Southern exposed slope, with a well represented herbous mezophilous vegetation.

VIII. Between Brăzeşti and Sălciua villages. Samples were taken on the left side of the Arieş river basin.

a. A *Saliceto-Alnetum* association nearby the river, at 436 m altitude. Beside the indicatory species, also *Corylus, Lamium, Agrostis, Ranunculus, Urtica, Rubus, Mentha* etc. species and some hygrophilous herbs were present.

b. A *Fageto- Carpi*netum association, a forest covering the upper half of a hill, on a South-Western exposed slope, at 475-500 m altitude. Old high trees as well as young ones and shrubs of *Crataegus mo0nogyna*, *Corylus avellana* and *Rosa canina* are present. The herbous bed contains mezophilous to mezo-hygrophilous herbs and weeds.

c. A lawn covering the first half of the same hill, South-Western exposed, at 460-475 m altitude, with a vegetation dominated by *Poaceae* and *Fabaceae* species.

IX. „Huda lui Papară", the area close to the cave with the same name, area belonging to Sălciua de Jos village.

a. A hygrophilous lawn to the cave mouth, containing mostly hygrophilous weeds.

b. A mezo-xerophilous lawn on the right side of the stream, a slight tilted slope with Southern exposition. Vegetation contains mostly xerophilous herbs and some mezo-xerophilous weeds.

X. Poşaga Valley area. Poşaga valley is one of the most important valley tributary to middle Arieş. Samples were taken upstream Poşaga de Sus village, not far from Săgagea village.

a. A *Salicetum* association containing also species of *Acer, Betula, Corylus*, and a weeden bed with species of *Mentha, Urtica, Verbascum, Ranunculus*, and hygrophilous herbs.

b. A pasture with bushes, on the left side of the valley, on a slight tilted zone, Southern exposed, with mostly mezo-xerophilous vegetation.

XI. Runcului Gorges, situated upstream of the Runc village, at 450 m altitude on the Ocoliş

valley, tributary on left side to middle Arieş river.

a. An *Alneto-Betulo-Salicetum* association with a representativ bed of herbs, *Terifolium* species, *Urtica* etc.

b. A thicket of trees and bushes, on the left side of the gorges and of the Ocoliş valley, a slope with Southern exposition. Species of *Alnus, Betula, Rosa, Crataegus, Pyrus, Salix*, *Corylus* and *Rubus* were present.

XII. Ocoliş, village situated to the Ocoliş vallaey mouth in a depfression area, at 420 m altitude.

a. A *Salicetum* association on the left side of the river, with hygrophilous weeden bed.

b. A pasture on the left side of Arieş river, with mezophilous herbs mixed with some weeds as *Verbascum blattaria*, *Achilea milefolium* etc.

XIII. Vidolm, village situated to the same named valley mouth, tributary on right side to middle Arieş river, at 450 m altitude. The whole valley flows begining to over 1000 m altitude, from the base of the tip Ardoscheia, covered by a protected forest of *Larix*.

a. A lawn in the first half of the slope, North-Eastern exposed, bordered to the top by a *Fagetum* association. It has a well developed mezophilous vegetation, represented mostly by herbs and some dicotyledonous plants as *Myosotis, Rumex, Euphorbia, Trifolium* etc. species.

b. A lawn with bushes of *Juniperus*, South-Western exposed slope, on the left side of the Vidolm valley, dominated by *Poaceae* species, containing also *Centaurea, Carex, Rumex* etc. species.

c. A *Betulo-Salicetum* association close to the Vidolm valley, having also *Fagus* individuals and species of *Urtica, Carex, Juncus* etc. in the herbous bed.

XIV. Ocolişel, a village situated along Ocolişel valley, at about 500 m altitude.

a. A lawn with mezophilous herbs mixed with *Trifolium, Centaurea, Mentha, Carduus* etc. species, on the left side of the valley.

b. A pasture with mezophilous species of *Gramineae* and others, as *Rumex, Cirsium*, *Centaurea, Viola* and *Genista* species, also situated on the left side of the valley.

c. An *Alnetum* association with species of *Trifolium, Petasites, Urtica* and different hygrophilous herbs.

XV. Lungeşti, a more extended village along middle Arieş river, begining to Ocolişel valley mouth.

a. A lawn on the left side of the river, dominated by herbs in mixture with *Trifolium*, *Urtica, Carduus*, etc species.

b. A pasture, also on the left side of the river, with *Centaurea, Mentha, Verbascum*, *Urtica, Lepidium* etc. species, mixed with species of *Gramineae*.

c. An *Alneto-Salicetum* association close to the river left side, having also species as *Corylus avellana, Trifolium repens, Mentha piperita, Urtica dioica* etc.

XVI. Buru. The extrem dawnstream village on the middle Arieş river basin, situated to the vallies mouth of Iara valley, on left side and of Rimetea valley on the right side.

a. A lawn on a Southern exposed slope of the left side of the river. Many herbs, as well as othre species as: *Trifolium pratense, Plantago lanceolata, Lotus corniculatus, Vicia* faba, *Melilotus officinalis Coronulla varia, Onobrychis vicifolia, Centaurea austriaca* etc. were present. The lawn, not so extended, is bordered by species of *Prunus, Pyrus, Corylus*, *Crataegus, Viburnum, Ligustrum, Acer*, in compact bushes.

b. A mezophilous weeden vegetation with *Urtica dioica, Mentha arvensis, Verbascum flomoides* and rare bushes of *Crataegus* and *Rosa*.

c. A pasture on the right side of the Arieş river, close to Rimetea valley mouth. It has a mezophilous character, with some hygrophilous zones having *Carex* and *Juncus* species as indicators.

Insects, collected by sweeping vegetation with an insect net, were put on 80^0 alcohol and then were kept dry till the identification, made in the laboratory using representative literature in the domenium (Mohr, 1966, Kaszab 1962-1971, Kippenberg and Doberl, 1986, Warchalowski, 1993, Rozner, 1966). Besides the material collected in 2003, we useed in this study also insects collected, in the same area, in the period 1998-2002, in order to better define the status of the investigated group.

Results and discussion

Below we present the taxonomical list of the captured and identified leaf-beetles in the middle Arieş river basin. The table contains also the capture data, the number and relative abundance of each species in every capture place, as well as the place of capture and ecdosystem.

Table 1.

Taxonmical list of leaf-beetles species captured in the middle Arieş river basin (Câmpeni-Buru area)

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
I. Donaciinae Kirby, 1937				
Plateumaris (Juliusiana) cionsi milis (Schrank, 1781)	02.06.98	99	9.43	I.b.
Plateumaris (Juliusiana) braccata (Scopoli, 1772)	13.06.03	2	0.19	X.a.
Plateumaris (Plateumaris) sericea (Linnaeus, 1761)	02.06.98	39	3.71	I.a.,I.b.
II. Criocerinae Latreille, 1807				
Oulema (Oulema) melanopus (Linnaeus, 1758)	22.04.98	1	0.10	VII.d.
	02.06.98	1	0.10	I.a.
	02.06.98	2	0.19	VII.b.
	01.06.98	1	0.10	VI.a.
	24.06.98	2	0.19	VII.b.
	24.06.98	1	0.10	VIII.c.
	25.06.98	1	0.10	VI.a.
	28.05.01	1	0.10	XIII.b.
	21.06.02	2	0.19	XIV.b.
	13.06.03	1	0.19	X.a.
Oulema (Haspidolema) erichsoni (Suffrian, 1841)	24.06.98	1	0.10	VII.c.
	22.06.02	2	0.19	XIII.a.
III. Clytrinae Kirby, 1837				
Labidostomis longimana (Linnaeus, 1761)	23.05.98	2	0.19	VIII.a.
	24.06.98	1	0.10	VIII.a.
	02.06.01	1	0.10	XII.a.
	21.06.02	1	0.10	XVI.a.
	21.06.02	5	0.48	XIV.a.
	21.06.02	5	0.48	XV.a.
	12.06.03	3	0.28	IX.b.
	11.06.03	1	0.10	III.a.
Labidostomis tridentata (Linnaeus, 1758)	21.06.02	3	0.28	XV.b.
	21.06.02	2	0.19	XIV.b.
Smaragdina salicina (Scopoli, 1763)	01.06.98	1	0.10	VIII.b
	22.06.02	2	0.19	XVI.a.
Smaragdina flavicollis (Charpentier, 1825)	24.06.98	1	0.10	VII.b
	27.07.99	1	0.10	VI.a
	21.06.02	1	0.10	XIV.c.
Smaragdina aurita (Linnaeus, 1767)	12.05.01	3	0.28	XVI.b.
	01.06.02	7	0.67	XVI.b.
	01.06.02	2	0.19	XV.c.
Smaragdina xanthaspis (Germar, 1824)	02.06.01	1	0.10	XII.a.
	21.06.02	3	0.28	XVI.a
	21.06.02	1	0.10	XIV.b.
	21.06.02	1	0.10	XIV.c.
	12.06.03	1	0.10	IX.a.
	12.06.03	3	0.28	IX.b.
Coptocephala unifasciata (Scopoli, 1763)	27.07.01	1	0.10	XVI.c.

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
IV. Cryptocephalinae Gyllenhal, 1813				
Pachybrachys sinuatus Mulsant et Rey, 1859	24.06.98	1	0.10	VIII.b
	01.06.02	2	0.19	XV.a
	21.06.02	2	0.19	XV.b
	13.06.03	3	0.28	X.a.
Pachybrachys hyppophaes (Suffrian, 1848)	01.06.02	1	0.10	XV.a.
	21.06.02	1	0.10	XIV.a
	22.06.02	2	0.19	XIII.b
	22.06.02	1	0.10	XIII.a
	11.06.03	1	0.10	III.b
	13.06.03	1	0.10	X.b
Cryptocephalus (Cryptocephalus) bipunctatus (Linnaeus, 1758)	23.05.98	1	0.10	VIII.c.
	02.05.01	1	0.10	XVI.a
	01.06.02	6	0.57	XVI.c.
	01.06.02	4	0.38	XV.c.
	22.06.02	2	0.19	XIII.a
	21.06.02	1	0.10	XIV.a
	21.06.02	7	0.67	XV.b
	22.06.02	2	0.19	XIII.b.
	21.06.02	3	0.28	XVI.a
	12.06.03	1	0.10	IX.b.
	12.06.03	1	0.10	I.a.
Cryptocephalus (Cryptocephalus) hippochoeridis (Linnaeus, 1758)	21.06.98	1	0.10	VII.a
	24.06.98	4	0.38	VII.c
	28.07.01	2	0.19	XIII.a
	01.06.02	2	0.19	XVI.b.
	21.06.02	2	0.19	XIV.a
	22.06.02	1	0.10	XIII.a.
	12.06.03	9	0.86	IX.b.
	12.06.03	3	0.28	I.a.
*Cryptocephalus (Cryptocephalus) sexpunctatus (*Linnaeus, 1758)	24.05.98	1	0.10	XI.a.
*Cryptocephalus (Cryptocephalus) cordiger (*Linnaeus, 1758)	24.05.98	1	0.10	XI.a.
Cryptocephalus (Cryptocephalus) flavipes Fabricius, 1781	01.06.98	3	0.28	VII.a.
	12.05.01	1	0.10	XVI.a
	01.06.02	1	0.10	XVI.a
	22.06.02	2	0.19	XVI.a.
	22.06.02	14	1.34	XVI.c.
Cryptocephalus (Cryptocephalus) sericeus (Linnaeus, 1758)	24.06.98	1	0.10	VII.c.
	25.06.98	1	0.10	VI.a.
	02.06.01	4	0.38	XII.a
	01.06.02	5	0.48	XV.b
	01.06.02	2	0.19	XVI.b.
	22.06.02	7	0.67	XIII.b.
	22.06.02	2	0.19	XVI.a

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
Cryptocephalus (Cryptocephalus) sericeus (Linnaeus, 1758)	22.06.02	1	0.10	XI.b
	21.06.02	5	0.48	XV.a.
	21.06.02	8	0.76	XIV.a
	22.06.02	2	0.19	XIII.a.
	12.06.03	3	0.28	IX.a.
	12.06.03	6	0.57	I.b.
	12.06.03	3	0.28	X.a.
	11.06.03	2	0.19	III.b.
*Cryptocephalus (Cryptocephalus) moraei (*Linnaeus, 1758)	25.06.98	1	0.10	VI.a.
	28.07.01	2	0.19	XIII.a.
	02.06.02	2	0.19	XII.a.
	01.06.02	1	0.10	XVI.b.
	22.06.02	4	0.38	XIII.a.
	21.06.02	7	0.67	XIV.a
	21.06.02	2	0.19	XV.a
	13.06.03	4	0.38	X.a.
	11.06.03	1	0.10	III.b.
Cryptocephalus (Cryptocephalus) frenatus Laicharting, 1781	12.05.01	6	0.57	XVI.a.
Cryptocephalus (Cryptocephalus) violaceus Laicharting, 1781	01.06.02	3	0.28	XV.a
	22.06.02	1	0.10	XIII.a.
	21.06.02	2	0.19	XV.a.
	22.06.02	4	0.38	XVI.c.
	12.06.03	2	0.19	IX.b
	13.06.03	1	0.10	X.a
*Cryptocephalus (Cryptocephalus) octopunctatus (*Scopoli, 1763)	01.06.02	1	0.10	XV.c
Cryptocephalus (Cryptocephalus) vittatus Fabricius, 1775	22.06.02	1	0.10	XIII.a.
	21.06.02	1	0.10	XIV.b.
	12.06.03	1	0.10	IX.b.
*Cryptocephalus (Cryptocephalus) biguttatus (*Scopoli, 1763)	21.06.02	2	0.19	XVI.a
	22.06.02	5	0.48	XIII.a.
	21.06.02	3	0.28	XIV.a
	21.06.02	2	0.19	XV.a.
	12.06.03	2	0.19	I.a
Cryptocephalus (Cryptocephalus) caerulescens C.R. Sahlberg, 1839	21.06.02	1	0.10	XIV.c.
Cryptocephalus (Cryptocephalus) quadripustulatus Gyllenhal, 1813	22.06.02	2	0.19	XVI.c.
Cryptocephalus (Proctophysus) schaefferi Schrank, 1789	12.05.01	1	0.10	XVI.a.
Cryptocephalus (Burlinius) carpathicus J. Frivaldsky, 1883	24.06.98	1	0.10	VII.a
Cryptocephalus (Burlinius) elegantulus Gravenhorst, 1807	12.05.01	1	0.10	XVI.a.
	02.06.01	1	0.10	IV.a.
Cryptocephalus (Burlinius) querceti Suffrian, 1848	12.05.01	1	0.10	XVI.a.

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
Cryptocephalus (Burlinius) ocellatus Drapiez, 1819	01.06.02	1	0.10	XVI.b
	01.06.02	8	0.76	XV.c.
	22.06.02	1	0.10	XIII.c.
	13.06.03	1	0.10	X.b.
Cryptocephalus (Burlinius) frontalis Marsham, 1802	21.06.02	2	0.19	XIV.b.
	11.06.03	1	0.10	I.a.
V. Lamprosomatinae Lacordaire, 1848				
Omorphus (Omorphus) concolor (Sturm, 1807)	01.06.98	5	0.48	VIII.c.
	23.05.98	1	0.10	VIII.b.
	24.06.98	2	0.19	VIII.b.
	12.06.03	2	0.19	IX.b.
	12.06.03	2	0.19	I.a.
	11.06.03	1	0.10	III.a
VI. Chrysomelinae Latreille, 1802				
Chrysolina (Chalcoidea) marginata (Linnaeus, 1758)	23.05.98	1	0.10	VIII.a.
*Chrysolina (Erythrochrysa) poli*ta (Linnaeus, 1758)	23.05.98	1	0.10	VIII.a.
	02.06.98	2	0.19	VII.d.
	02.06.98	1	0.10	I.b.
	01.06.98	4	0.38	VII.b.
	24.06.98	1	0.10	VIII.b
	24.06.98	5	0.48	VII.b.
	24.05.98	2	0.19	XI.a.
	27.07.99	1	0.10	VI.a.
	12.05.01	1	0.10	XIII.c.
	13.06.03	1	0.10	X.a.
Chrysolina (Menthastriella) herbacea (Duftschmid, 1825)	23.05.98	5	0.48	VIII.a.
	22.05.98	3	0.28	VII.b.
	24.05.98	4	0.38	XI.a.
	01.06.98	7	0.67	VI.a.
	01.06.98	9	0.86	VII.b.
	12.05.01	1	0.10	XIII.c.
	02.06.01	2	0.19	V.a.
	01.06.02	4	0.38	XVI.b.
	22.06.02	8	0.77	XI.a.
	21.06.02	3	0.28	XIV.c.
	12.06.03	2	0.19	IX.a.
	13.06.03	15	1.43	X.a.
Chrysolina (Ovostoma) caerulea (Olivier, 1807)	23.05.98	1	0.10	VIII.b.
	02.06.98	1	0.10	I.b.
	23.06.02	1	0.10	XIII.b.
Chrysolina (Sphaeromela) varians (Schaller, 1783)	23.06.98	1	0.10	VII.a
	12.06.03	3	0.28	VII.c.
	13.06.03	1	0.10	VII.c

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
Chrysolina (Sphaeromela) varians (Schaller, 1783)	23.05.98	1	0.10	VIII.c.
	01.06.98	1	0.10	I.b.
	24.06.98	2	0.19	I.a.
	24.06.98	2	0.19	X.a.
Chrysolina (Hypericia) geminata (Paykull, 1799)	01.06.98	1	0.10	VIII.b.
	24.06.98	1	0.10	VII.c.
	12.06.03	1	0.10	I.a.
Chrysolina (Hypericia) hyperici (Forster, 1771)	24.06.98	1	0.10	VIII.a.
Chrysolina (Hypericia) cuprina Duftschmid, 1825	24.06.98	1	0.10	VI.a.
	24.06.98	1	0.10	VII.b.
*Chrysolina (Sphaerochrysolina) rufa (*Duftschmid, 1825)	23.05.98	1	0.10	VIII.a.
	02.06.98	1	0.10	I.b.
	02.06.98	4	0.38	VII.a.
	24.06.98	2	0.19	VIII.b.
*Chrysolina (Chalcoidea) carnifex (*Fabricius, 1792) ssp. *caerulescens* Suffrian, 1848	24.06.98	1	0.10	VIII.b.
*Chrysolina (Minkia) chalcites (*Germar, 1824)	24.06.98	1	0.10	VIII.c.
	24.06.98	1	0.10	VII.b.
*Chrysolina (Heliostola) lichenis (*Richter, 1820)	02.06.01	1	0.10	IV.a.
Chrysolina (Colaphosoma) sturmi (Westhoff, 1882)	02.06.01	1	0.10	XII.b.
	02.06.01	1	0.10	V.a.
Chrysolina (Colaphoptera) crassimargo (Germar, 1824)	22.06.02	1	0.10	XIII.a
*Chrysolina (Fastuolina) fastuosa (*Scopoli,1763)	23.05.98	6	0.57	VII.b.
	01.06.98	3	0.28	VII.b.
	24.06.98	2	0.19	VII.c
	24.05.98	1	0.10	XI.a.
	02.06.01	2	0.19	IV.a.
	01.06.02	4	0.38	XV.c.
	01.06.02	1	0.10	XVI.b.
	12.06.03	1	0.10	IX.a.
	13.06.03	1	0.10	X.a.
*Oreina (Chrysochloa) cacaliae (*Schrank, 1758)	23.05.98	4	0.38	VI.a.
	24.06.98	14	1. 33	VII.b.
	02.06.01	1	0.10	IV.a.
Oreina (Allorina) bidentata Bontems, 1981	23.05.98	3	0.28	VIII.a.
	27.07.99	7	0.67	VI.a.
*Oreina (Allorina) caerulea (*Olivier, 1790)	25.06.98	3	0.28	VI.a.
Oreina (Virgulatorina) virgulata Germar, 1824	27.07.99	1	0.10	VI.a.
*Oreina (Intricatorina) intricata (*Germar, 1824) ssp. *anderschi* (Duftschmid, 1825)	22.06.02	3	0.28	XI.a.
Colaphus sophiae (Schaller, 1783)	01.06.98	1	0.10	I.b.
	02.06.98	1	0.10	II.a.
Gastroidea viridula (De Geer 1775)	23.05.98	1	0.10	VII.d.
*Gastroidea polygoni (*Linnaeus, 1758)	12.05.01	3	0.28	XVI.a.
	22.06.02	1	0.10	XI.b.
	22.06.02	1	0.10	XIII.c.

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
Phaedon (Phaedon) cochleariae Fabricius, 1792	22.04.98	1	0.10	VII.d.
*Plagiodera versicolora (*Laicharting, 1781)	02.06.98	1	0.10	VII.a.
	02.06.98	1	0.10	I.b.
*Linaeidea (Linaeidea) aenea (*Linnaeus, 1758)	02.06.98	6	0.57	VII.b.
	02.06.98	1	0.10	I.b.
	01.06.98	2	0.19	VIII.a.
	25.06.98	2	0.19	VI.a.
	24.06.98	1	0.10	VII.b.
Chrysomela (Strikerus) vigintipunctata (Scopoli, 1763)	24.05.98	12	1.14	VII.b.
	02.06.98	10	0.95	I.b.
	23.05.98	3	0.28	VIII.a.
	01.06.98	1	0.10	VIII.a.
	23.04.98	1	0.10	I.b.
Chrysomela (Strikerus) cupraea (Fabricius, 1775)	24.05.98	13	1.24	XI.b.
	24.06.98	1	0.10	VII.b.
	24.06.98	1	0.10	VIII.a.
	23.09.98	1	0.10	VII.a.
	22.06.02	2	0.19	XI.a.
Gonioctena (Gonioctena) linnaeana (Schrank, 1781)	02.06.98	1	0.10	I.b.
	23.05.98	2	0.19	VII.a.
	23.09.98	1	0.10	I.b.
Gonioctena (Gonioctena) nivosus (Suffrian, 1851) (ex, melanic)	02.06.98	1	0.10	VII.c.
	11.06.03	2	0.19	I.a.
Gonioctena (Gonioctena) affinis (Gyllenhal, 1813)	23.09.98	1	0.10	I.b.
	12.06.03	2	0.19	III.a.
	11.06.03	6	0.58	I.b.
Gonioctena (Goniomena) intermedia (Helliesen, 1913)	24.06.98	1	0.10	VIII.b.
Phratora (Phratora) vitellinae (Linnaeus, 1758)	02.06.98	2	0.19	VII.b.
	02.06.98	4	0.38	I.b.
	24.05.98	1	0.10	XI.a.
Phratora (Phratora) laticollis Suffrian, 1851	02.06.98	15	1.43	I.b.
	02.06.01	3	0.28	XII.a.
*Phratora (Phratora) tibialis (*Suffrian, 1851)	02.06.98	7	0.67	I.b.
Phratora (Chaeroceta) vulgatissima (Linnaeus, 1758)	13.06.03	1	0.10	X.a.
	13.06.03	1	0.10	III.b.
Timarcha (Metallotimarcha) gibba Hagenbach, 1825	23.05.98	1	0.10	I.a.
*Timarcha (Metallotimarcha) metallica (*Laicharting, 1781)	02.06.98	2	0.19	I.a.
	02.06.98	1	0.10	II.a.
	02.,06.98	1	0.10	VII.a.
	23.09.98	1	0.10	VII.a.
Timarcha (Timarchostoma) goettingensis (Linnaeus, 1758)	23.09.98	1	0.10	I.a.
VII. Galerucinae Latrerille, 1802				

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
Xanthogaleruca luteola O.F.Muller, 1766	23.05.98	2	0.19	VII.c.
	02.06.98	1	0.10	VII.c.
	23.05.98	1	0.10	I.b.
	02.06.01	1	0.10	XII.b.
*Galerucella (Neogalerucella) pusilla (*Duftschmid, 1825)	02.06.98	3	0.28	I.b.
Galeruca (Galeruca) tanaceti (Linnaeus, 1758)	01.06.98	1	0.10	VIII.a
	24.06.98	5	0.48	VII.c.
	24.06.98	3	0.28	VIII.a.
	25.06.98	6	0.57	VI.a.
	12.05.01	2	0.19	XVI.a.
	12.06.03	1	0.10	IX.b
Galeruca (Galeruca) pomonae (Scopoli, 1763)	25.06.98	15	1.43	VI.a.
Lochmea capreae (Linnaeus, 1758)	24.05.98	1	0.10	XI.a.
	24.06.98	1	0.10	VII.c.
Phyllobrotica adusta (Creutzer, 1799)	12.06.03	2	0.19	IX.b.
Luperus luperus (Sulzer, 1776)	21.06.02	2	0.19	XIV.c.
Luperus flavipes (Linnaeus, 1767)	22.06.02	1	0.10	XIII.b.
VIII. Alticinae Kutschera, 1859				
Phyllotreta undulata (Kutschera, 1860)	02.06.98	1	0.10	VII.c.
Phyllotreta exclamationis (Thunberg, 1784) *f.a. maculipennis*	24.06.98	1	0.10	VIII.c
Phyllotreta nemorum (Linnaeus, 1758)	23.04.98	1	0.10	VII.c.
	23.05.98	1	0.10	VIII.c
	01.06.98	1	0.10	I.a.
Phyllotreta ochripes (Curtis, 1837)	21.06.02	1	0.10	XIV.b.
Phyllotreta armoraciae (Koch, 1803)	12.06.03	12	1.14	I.a.
Phyllotreta vittula (Redtenbacher, 1849)	28.07.01	1	0.10	XIII.b
Aphthona euphorbiae (Schrank, 1781)	23.05.98	1	0.10	VII.b.
	22.04.98	1	0.10	VI.a.
	22.04.98	2	0.19	VII.c
	12.05.01	3	0.28	XIII.c.
	27.07.01	1	0.10	XVI.a.
Aphthona stussineri Weise, 1888	28.07.01	3	0.28	XIII.b.
	28.07.01	2	0.19	XIII.a.
	22.06.02	1	0.10	XIII.b.
Aphthona cyanella (Redtenbacher, 1849)	12.05.01	2	0.19	XIII.a.
Aphthona lacertosa (Rosenhauer, 1847)	22.06.02	2	0.19	XIII.b.
	21.06.02	10	0.96	XIV.a.
	13.06.03	5	0.48	X.b.
Aphthona ovata Foudras, 1861	28.07.01	2	0.19	XIII.a.
	12.06.03	1	0.10	IX.b.
Aphthona nigriscutis Foudras, 1861	12.06.03	1	0.10	IX.b.
Aphthona herbigrada (Curtis, 1837)	27.07.01	1	0.10	XVI.a.
Aphthona venustula Kutschera, 1861	28.08.01	1	0.10	XIII.a.

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
Longitarsus (Longitarsus) lycopi (Foudras, 1860)	23.05.98	2	0.19	VIII.a.
	02.06.98	1	0.10	VII.c.
	12.05.01	1	0.10	XIII.b.
	21.06.02	1	0.10	XIV.b.
*Longitarsus (Longitarsus) nigrofasciatus (*Goeze, 1777)	23.05.98	1	0.10	VIII.a.
	01.06.98	1	0.10	VII.c.
*Longitarsus (Longitarsus) rubiginosus (*Foudras, 1860)	24.06.98	1	0.10	VIII.a.
*Longitarsus (Longitarsus) melanocephalus (*De Geer, 1775)	28.07.01	1	0.10	XIII.b.
Longitarsus (Longitarsus) waterhousei Kutschera, 1864	22.06.02	1	0.10	XVI.a
Longitarsus (Longitarsus) rubellus (Foudras, 1860)	23.05.98	1	0.10	VIII.a.
	12.06.03	1	0.10	IX.b.
Longitarsus (Longitarsus) pratensis (Panzer, 1794)	13.06.03	1	0.10	X.a.
	11.06.03	1	0.10	III.b.
Longitarsus (Longitarsus) brunnaeus (Duftschmid, 1825)	23.05.98	1	0.10	VII.d.
	28.07.01	1	0.10	XVI.a.
Longitarsus (Testergus) anchusae (Paykull, 1799)	22.06.02	1	0.10	XVI.c.
Altica oleracea (Linnaeus, 1758)	23.05.98	1	0.10	VI.a.
	23.05.98	1	0.10	VIII.a.
	01.06.98	1	0.10	VII.b.
	19.08.01	2	0.19	XII.b.
	22.06.02	2	0.19	XIII.a.
	21.06.02	2	0.19	XIV.b.
Batophila fallax Weise, 1888	23.05.98	3	0.28	VII.b.
	23.05.98	2	0.19	VIII.a.
	01.06.98	1	0.10	I.a.
	01.06.98	5	0.48	VIII.a.
	02.06.98	12	1.14	VII.c.
	02.06.98	2	0.19	I.b.
	13.06.03	1	0.10	X.a.
Lytharia salicariae (Paykull, 1800)	01.06.98	1	0.10	VII.b.
	12.06.03	4	0.38	I.a.
Asiorestia ferruginea (Scopoli, 1763)	01.06.98	1	0.10	VII.c.
	02.06.98	1	0.10	I.b.
	24.06.98	2	0.19	VII.c.
	24.06.98	1	0.10	VIII.a.
	25.06.98	2	0.19	VI.a.
	27.07.99	1	0.10	VI.a.
	01.06.02	1	0.10	XVI.b.
	22.06.02	2	0.19	XI.b.
	21.06.02	4	0.38	XIV.a.
	12.06.03	3	0.28	I.a.
	13.06.03	1	0.10	X.a.
	11.06.03	9	0.86	III.b.

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
Asiorestia transversa (Marsham, 1802)	28.07.01	1	0.10	XIII.b.
	01.06.02	1	0.10	XV.a,
	22.06.02	1	0.10	XI.a.
	21.06.02	1	0.10	XIV.c.
	11.06.03	2	0.19	I.a.
Orestia carpathica Reitter, 1879	11.06.03	1	0.10	I.a.
Derocrepis rufipes (Linnaeus, 1761)	22.06.02	1	0.10	XIII.b.
Hippuriphila modeeri (Linnaeus, 1761)	02.06.98	23	2.19	I.b.
Crepidodera aurata (Marsham, 1802)	23.05.98	1	0.10	VIII.a.
	02.06.98	4	0.38	VII.b.
	02.06.98	2	0.19	I.b.
	02.06.01	2	0.19	V.a.
Crepidodera aurea (Geoffroy, 1785)	02.06.98	2	0.19	I.b.
Crepidodera plutus (Latreille, 1804)	23.04.98	1	0.10	I.b.
Minota carpathica Heikertinger, 1911	02.06.98	2	0.19	I.a.
Mantura obtusata (Gyllenhal, 1813)	24.06.98	1	0.10	VIII.a.
Mantura chrysanthemi (Koch, 1803)	24.06.98	1	0.10	VIII.a.
Mantura mattewsi (Curtis, 1833)	12.06.03	2	0.19	I.a.
	13.06.03	1	0.10	X.b.
	11.06.03	2	0.19	III.b.
Chaetocnema (Tlanoma) concinna (Marsham, 1802)	12.05.01	1	0.10	XIII.b.
Chaetocnema (Tlanoma) clorophana (Duftschmid, 1825)	22.06.02	1	0.10	XVI.a.
*Chaetocnema (Tlanoma) semicoerulea (*Koch, 1803)	02.06.98	1	0.10	VII.c.
Chaetocnema (Tlanoma) tibialis (Illiger, 1807)	23.05.98	1	0.10	VIII.a.
*Sphaeroderma rubidum (*Graells, 1858)	24.06.98	1	0.10	VII.c.
Dibolia (Dibolia) timida (Illigae, 1807)	12.05.01	1	0.10	XVI.a.
Psylliodes (Psylliodes) weberi Lohse	22.06.02	1	0.10	XI.b.
Psylliodes (Psylliodes) attenuata (Koch, 1803)	23.05.98	1	0.10	VII.c.
IX. Cassidinae Gyllenhal, 1813				
Hyppocassida subferruginea (Schrank, 1776)	22.06.02	1	0.10	XIII.b.
Cassida (Cassida) denticollis Suffrian, 1844	01.06.98	1	0.10	VII.d.
	01.06.98	2	0.19	VI.a.
Cassida (Cassida) nebulosa Linnaeus, 1758	02.06.98	1	0.10	I.b.
	23.05.98	1	0.10	VIII.a
	01.06.98	1	0.10	VIII.a.
	02.06.01	2	0.19	IV.a.
Cassida (Cassida) ferruginea Goeze, 1777	01.06.98	1	0.10	VIII.a.
Cassida (Cassida) berolinensis Suffrian, 1844	23.05.98	1	0.10	VIII.a.
	01.06.09	2	0.19	VII.b.
	01.06.98	1	0.10	VIII.a.
	24.06.98	1	0.10	VIII.a.
Cassida (cassida) vibex Linnaeus, 1767	01.06.98	3	0.28	VIII.a.
	24.06.98	2	0.19	VII.c.
	25.06.98	1	0.10	VI.a.

Subfamily / Species	Capture date.	Spcm. nr.	Abd. %	Code of place and habitate*
Cassida (Cassida) rubuginosa O.F. Muller, 1776	24.06.98	1	0.10	VIII.a.
	24.06.02	2	0.19	XIII.a.
	11.06.03	3	0.28	III.b.
	11.06.03	1	0.10	I.b.
Cassida (Cassida) pazeri Weise, 1907	24.06.98	1	0.10	VIII.a.
Cassida (Cassida) pannonica Suffrian, 1844	25.06.98	8	0.76	VI.a.
Cassida (Cassida) flaveola Thunberg, 1794	11.06.03	1	0.10	I.a.
Cassida (Odonthionycha) viridis Linnaeus, 1758	23.05.98	1	0.10	VIII.a.
	24.05.98	1	0.10	XI.a.
	01.06.98	3	0.28	VII.b.
	01.06.98	1	0.10	VIII.a.
	24.06.98	1	0.10	VIII.a.
	27.07.99	1	0.10	VI.a.
	13.06.03	2	0.19	X.a.
	11.0.03	1	0.10	I.a.
Cassida (Myonicha) azurea Fabricius, 1801	23.05.98	1	0.10	VIII.a.

* E xplanations of the codes are the same given in „material and methods"; **Nr. ind**. = number of captured individuals; **Abd.** = relative abundance; **Spcm. nr.** = number of specimens.

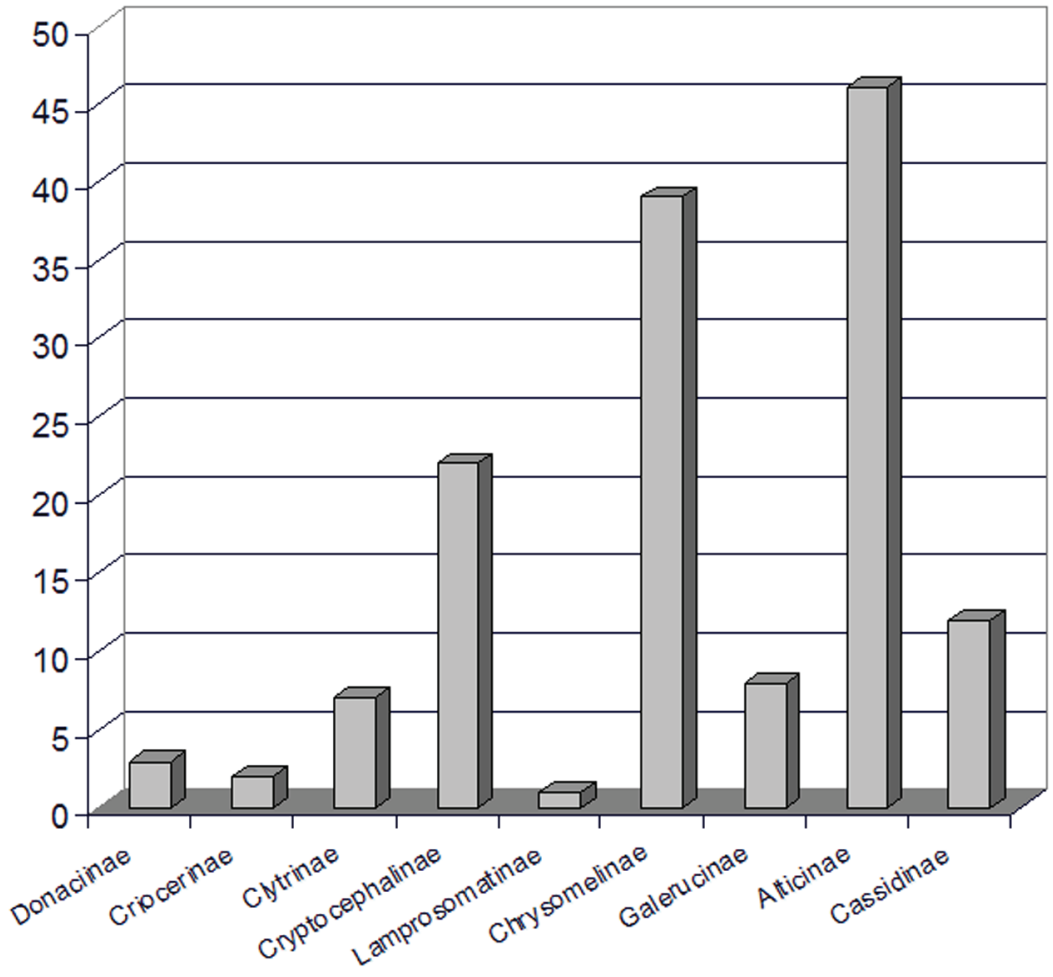

Fig. 1. The biodiversity among the leaf-beetle subfamilies identified in the middle Arieş river basin.

In the whole considered period, 1998-2003, we captured a number of 1050 leaf-beetle individuals in which we identified 140 species from 44 genera and 9 subfamilies.

Consequently, as we showed for the upper Arieş river basin (Crişan and Teodor, 2003), the biodiversity of leaf-beetles was at a high level also in the middle Arieş river basin.

The best represented subfamilies were: Alticinae, with 46 species, followed by Chrysomelinae, with 39 species and Cryptocephalinae, with 22 species. A middle number of species was registered for Cassidinae (12 species), Galerucinae (8 species) and Clytrinae (7 species) and to the opposite pole were situated Donaciinae, with 3 species, Criocerinae, with 2 species and Lamprosomatinae, with a single species (Fig. 1.)

Generally, the level of representation of each leaf-beetle subfamily in the middle Arieş river basin , concerning the number of species, had a similary trend to the Central-European area one, a prove of the representativity of the researched zone for the Central-European area, concerning the ecological conditions. The same conditions, very different from a place to another, made that in the best represented subfamilies exist species with opposite ecological demands. Each of these species found, in the investigated area, the appropriate conditions of climate, orography, soil, and vegetation to better develop.

The best represented genera were *Cryptocephalus*, with 20 species, *Chrysolina*, with 15 species, *Cassida*, with 11 species, *Longitarsus* , with 9 species and *Aphthona*, with 8 species. A number of 20 from the 44 identified genera had a single species, 9 genera had two species, 3 genera had 3 species, 5 genera had 4 species and one genus had 5 respectively 6 species (Fig. 2.).

The great diversity of the genera existing in the investigated area, as we prove also for the subfamilies, is a consequence of the variate pedo-climatical and fitocenological conditions that allowed the constitution of diverse microhabitates.

One remark also the presence, in a relative great number of species, of some genera more rare

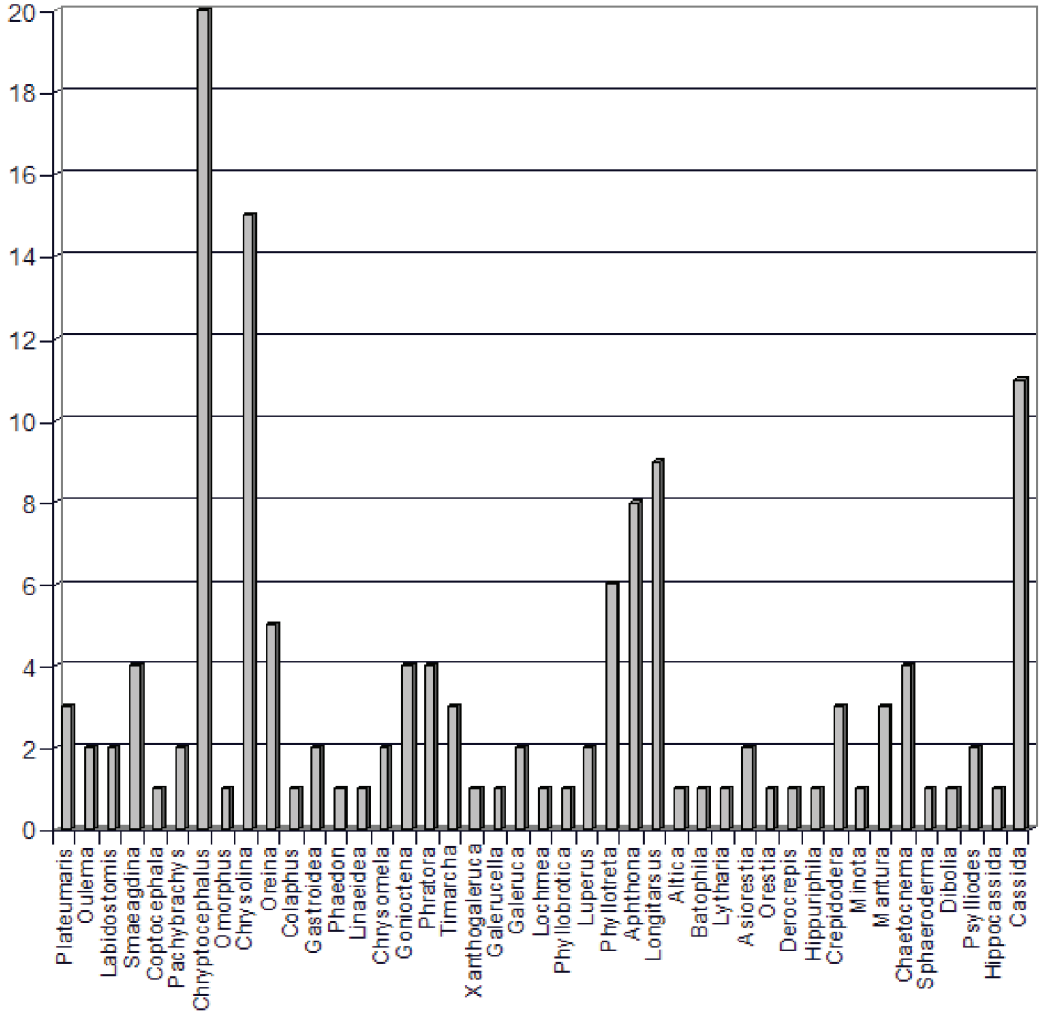

Fig. 2. The biodiversity among the leaf-beetle gnera identified in the middle Arieş river basin.

in the Transylvanian fauna, and even in the country fauna, as: *Smaragdina*, with 4 species, *Gonioctena*, with 4 species and *Mantura*, with 3 species.

The middle Arieş river basin have also rare and very rare species of leaf-beetles that may be considered as endangered, so are: *Smaragdina flavicollis, Smaragdina xanthaspis, Coptocephala unifasciata* (species characteristical to South-Eastern country zones), *Cryptocephalus cordiger, Cryptocephalus schaefferi, Cryptocephalus frontalis, Chrysolina hyperici, Chrysolina crassimargo, Chrysolina cuprina, Gonioctena linnaeana, Gonioctena nivosus, Gonioctena intermedia, Phratora tibialis, Galerucella pusilla* (also characteristical to South-Eastern country areas), *Phyllobrotica adusta, Luperus luperus, Phyllotreta exclamationis, Phyllotreta ochripes, Aphthona cyanella, Lytharia salicariae, Orestia carpathica, Derocrepis rufipes, Hippuriphilla moderi, Crepidodera aurea, Minota carpathica, Mantura obtusata, Dibolia timida, Psylliodes weberi, Hyppocassida subferruginea, Cassida ferruginea, Cassida panzeri, Cassida azurea.*

All the above presented discussions may constitute arguments for the ecological protection of the investigated area, necessary mostly in the actual development of the agroturism and the extension of the mining exploatations in the Arieş river basin.

REFERENCES

Crişan A. 1993a. Date asupra familiei Chrysomelidae (Coleoptera) în partea sudică a Deltei Dunării., An. şt. Inst., Tulcea, 67-74.

Crişan A. 1993b, Cercetări faunistice şi ecologice asupra familiei Chrysomelidae (Coleoptera) în cheile Turzii în 1992., Studia Univ. "Babeş-Bolyai", Biol. **38** (1-2): 59-67.

Crişan A. 1994. Noi date asupra familiei Chrysomelidae (Coleoptera) în Rezervaţia Biodferei „Delta Dunării"., An. şt. Inst. „Delta Dunării" Tulcea, 159-166.

Crişan A. Teodor L. 1994. Researches on leaf-beetles (Coleoptera, Chrysomelidae) in "Scărița Belioara"Botanical Reservation., Bul inf. soc. lepid. rom., **7** (3-4): 255-260.

Crişan A. 1995, Cercetări asupra familiei Chrysomelidae (Coleoptera) în Rezervaţia Biosferei "Delta Dunării", cu referire specială la *Stilosomus tamaricis* H-Schaeff. şi *Cryptocephalus gamma* H-Schaeff., Bul. inf. Soc. lepid. rom., **6** (1-2), 145-149.

Crişan A., Bonea V. 1995. Studiu faunistic asupra crizomelidelor (Coleoptera, Chrysomelidae) din zona Arcalia, (Jud. Bistriţa-Năsăud)., Bul.inf. soc.lepid. rom., **6** (3-4): 305-317.

Crişan A., Popa V., Teodor L. 1998. Leaf-beetles (Coleoptera: Chrysomelidae) from the area "Cheile Someşului Cald- Ic Ponor", Romania., Bul.inf. Soc. lepid. rom., **9** (1-2): 127-132.

Crişan A., Popa V., Teodor L. 1999. Studies on leaf-beetle fauna (Coleoptera: Chrysomelidae) in "Someşului Cald Gorges" area, Romania., Bul. inf. Soc. lepid. rom., **10** (1-4): 131-135.

Crişan A., Teodor L., Nistor L. 2000. Data on leaf-beetle fauna (Coleoptera, Chrysomelidae) in the North-West Transsylvania (Romania)., Bul. inf. Soc. lepid. rom**., 11,** (1-4): 115-122.

Crişan A., Druguş M. 2001. Studiul faunistic şi ecologic al crizomelidelor (Coleoptera, Chrysomelidae) din zona de confluenţă a Târnavelor., Bul. inf. Soc. lepid. rom.,**12,** (1-4): 191-200.

Crişan A., Teodor L., 2003, Researches on leaf-beetles (Coleoptera Chrysomelidae) from the upper Arieş river basin., Bul. inf. soc. lepid. rom.**13** (1-4)

Fleck E. 1905. Die Coleopteren Rumaniens., Bul. Soc Şt., 14 (1-6): 680-735.

Gruev P., Merkl O., Vig K. 1993. Geographical distribution of Halticinae (Coleoptera, Chrysomelidae) in Romania., Ann. Hist. Nat. Mus. Hung., **85**: 75-132.

Ieniştea M.A. 1968. L'entomofaune de l île de Letea (Delta du Danube), ord. Coleoptera (pars)., Trav. Mus. Hist. Nat. "Gr. Antipa"., **8**: 81-93.

Ieniştea M.A. 1974. Contribution a la connaisance des coleopteres du Delta du Danube (la "grind" Caraorman)., Trav. Mus. Hist. Nat. "Gr. Antipa"., **14**: 239-249.

Ieniştea M. A. & Negru Ş. 1975. Seria monografică "Porţile de Fier", Coleoptera, Ed. Acad.Rom., Bucureşti, 193-214.

Ilie A.L. 2001. Cercetări privind fauna de crizomelide (Coleoptera, Chrysomelidae) din municipiul Craiova şi împrejurimi., Bul. inf. Soc. lepid. rom., **12,** (1-4): 201-208.

Kaszab Z. 1962-1971. Magyarorszag allatvilaga, Bogarok IV/B (Fauna Hungariae, Coleoptera IV/B)., Akad. kiado, Budapest.

Kippenberg H., Doberl M. 1994. Familie Chrysomelidae, in Lohse & Lucht "Die Kafer Mitteleuropas",Supplementband, Krefeld.

Konnert-Ionescu A. 1963. Halticinae recorded from Romania till 1961., Trav. Mus. Hist. Nat "Gr. Antipa"., **4**: 251-268.

Maican S., Serafim R. 2001. Chrysomelidae (Coleoptera) from Maramureş (Romania)., Trav. Muz. Nat. Hist Natur"Grigore Antipa", 43: 199-233.

Marcu O. 1927. Neue Coleopteren aus der Bucovina., Bul. Fac, şt. Cernăuţi, **1** (2): 413-423.

Marcu O. 1928. Beitrage zur Coleopterenfauna der Bucovina., Bull. Sci. Ec. Polytech., Timişoara, 4-11.

Marcu O. 1936. Coleopterenfunde aus der Bucovina., Bull. sect. sci. Acad. Roum., **16** :1-6.

Marcu O. 1957. Contribuţii la cunoaşterea faunei coleopterelor Transilvaniei., Bul. Univ. V. Babeş şi I. Bolyai, ser. Şt. Nat, 1. (1-2), 527-544.

Mohr K.H. 1966. Chrysomelidae, in Freude, Harde, Lohse "Die Kefer Mitteleuropas", Goekeund Evers-Krefeld, Zurich, 95-299.

Negru Ş. 1968. L entomofaune de l île de Letea (Delta du Danube), ord. Coleoptera (pars)., Trav. Mus. Hist. Nat. "Gr. Antipa", **9**: 81-83.

Negru Ş., Roşca A. 1967. L entomofaune des forets du Sud de la Doubroudja, ord.Coleoptera (pars), Trav. Mus. Hist. Nat. "Gr. Antipa"., **7**: 119-145.

Panin S. 1951. Determinatorul coleopterelor dăunătoare şi folositoare din R.P. Romană., Ed. lit. şt. did. Bucureşti, 126-150.

Petri K. 1912. Siebenburgens Kaferfauna auf Grund ichrer Erforschung bis zum Jahre 1911., Buchdruckerei Jus. drotleff, Hermannstadt, 253-286.

Roşca A. 1973, Contributions a la connaissance du genre *Cryptocephalus* Foucr. (Coleoptera, Chrysomelidae) en Roumanie., Trav. Mus. Hist. Nat. "Gr. Antipa"., **13**, 143-154.

Roşca A. 1974. Contributions a la connaissance du genre *Chrysomela* L. (Coleoptera, Chrysomelidae) en Roumanie., Trav. Mus. Hist. Nat. "Gr. Antipa", **14**: 250-259.

Roşca A. 1976. L entomofaune du Nord de la Dobrogea, la zone Măcin – Tulcea- Niculiţel, ord. Coleoptera (pars)., Trav. Mus. Hist. Nat. "Gr. antipa"., **17:** 145-152.

Rozner I. 1996. An update list of the Chrysomelidae of Hungary and the adjoining parts of the Carpathian Basin (Coleoptera)., Folia Entomol. Hung., **57**: 234-260.

Seidlitz G. 1891. Fauna Transsylvanica, die Kafer (Coleoptera) Siebenburgens., Hartungsche Verlagsdruckerei, Konigsberg, 753-823.

Szel G., Rozner I., Kocs I. 1995. Contribuţii la cunoaşterea coleopterelor din Transilvania (România) pe baza colectărilor din ultimii ani., Acta Muz. Secuiesc al Ciucului, Muz. Naţ. Secuiesc, 73-92.

Warkalowsky A. 1993. Fauna Polski- Fauna Poloniae- Chrysomelidae (Coleoptera, Insecta), Tom. 15., Pol. Akad. Nauk., Warszawa.

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