CONTRIBUTION TO THE KNOWLEDGE OF THE SPECIES OF GALERUCINAE (COLEOPTERA, CHRYSOMELIDAE) FROM BIHOR COUNTY (ROMANIA)

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Abstract. Research about the leaf-beetles from this subfamily during 2010-2015 in Bihor County revealed the presence of 14 species belonging to 9 genera. It is presented the number of collected specimens at each species, the localities, the host-plants, the frequency in Romania and in Bihor County, and the geographical distribution. The species *Euluperus major* Weise, 1886 is very rare at national level. After the nutritional characteristics, polyphagous species predominate – 7 (50%). From the geographical distribution point of view, we have noted a great variety of the species.

Keywords: Galerucinae, Chrysomelidae, Bihor County, ecological data.

Rezumat. Contribuţii la cunoaşterea subfamiliei Galerucinae (Coleoptera, Chrysomelidae) din judeţul Bihor (România). Cercetările noastre despre gândacii de frunze din această subfamilie, timp de cinci sezoane, în perioada 2010-2015 în judeţul Bihor, au evidenţiat prezenţa a 14 specii, aparţinând la 9 genuri. La fiecare specie sunt prezentate numărul de exemplare colectate, localităţile, plantele-gazdă, frecvenţa în România şi în judeţul Bihor, răspândirea zoogeografică. Specia *Euluperus major* Weise, 1886 este foarte rară la nivel naţional. După caracteristicile nutritive, predomină speciile polifage – 7 (50%). Din punct de vedere al răspândirii geografice se constată o mare varietate a zonelor zoogeografice în care trăiesc speciile.

Cuvinte cheie: Galerucinae, Chrysomelidae, judeţul Bihor, date ecologice.

INTRODUCTION

Belonging to the historical province Crișana, Bihor County is located in the north-western part of Romania. The relief is various: plains, hills, mountains (altitude up to 1848 m). The climate is temperate-continental moderate. The hydrographical network is various: lakes, rivers. The vegetation is various, having a predominant central-European origin (BERINDEI & POP, 1978).

Data about the presence of leaf-beetles from Bihor area were published beginning with the end of the 19th century (MOCSARY, 1875) and the beginning of the 20th century (KUTHY, 1900).

After almost 50 years, previous data are completed with new ones from new papers (PANIN, 1944; MARCU, 1957, 1964; KASZAB, 1962; GRUEV & MERKL, 1993; SZEL et al., 1995).

In the 21th century, different researchers (ILIE, 2010; 2012; 2013; 2014; ILIE & MARINESCU, 2015) published new data about the leaf-beetles from Bihor county.

Research studies on other subfamilies (Chryptocephalinae, Cassidinae, Chrysomelinae and Donaciinae*)* from Bihor County, from the point of view of their nutritional characteristics, were published by ILIE & MARINESCU (2014a, b).

MATERIALS AND METHODS

The chrysomelids were collected during seven months, April-October, for five years (2010-2015).

The nomenclature and the classification were used according to LOBL & SMETANA, 2010.

As method of collecting we used an entomological net, sweeping the vegetation (bushes and herbs).

The identification of species was made in the laboratory, using two sources mentioned in specialized literature (KASZAB, 1962; WARCHALOWSKI, 2003).

RESULTS AND DISCUSSIONS

In the analyzed period, there were identified 14 species belonging to 9 genera.

Family Chrysomelidae Latreille, 1802

Subfamily Galerucinae Latreille, 1802

Diabrotica Chevrolat, 1844

1. *Diabriotica virgifera virgifera* Le Conte, 1898

Material: 158 specimens collected in maize crops from the followings 16 localities: Tinca, Husasău de Tinca, Salonta, Cociuba Mare, Râpa, Gurbediu, Batăr, Miersig, Miheleu, Șoimi, Olcea, Călacea, Ianoșda, Ciumeghiu, Căuașd, Cefa.

Host plants: *Zea mays*.

Geographical distribution: common species, important pest of maize crops from Romania. Holarctic species.

Agelastica Chevrolat, 1837

2. *Agelastica alni* Linnaeus, 1758

Material: 127 specimens collected from Budureasa and Râpa forest.

Hostplants: *Alnus* sp.
Geographical distribution: common species of hilly and lower altitude mountain areas from Romania. Species present in Europe and Asia Minor.

Pyrrhalta Joannis, 1866

3. *Pyrrhalta viburni* Paykull, 1799.

Material: three specimens –Tinca, June 28, 2012; Căuaşd, June 3, 2014 and Miheleu, July 10, 2015.
Hostplants: *Viburnum* sp.
Geographical distribution: relatively common presence in Romania, being mentioned for first time in Bihor. European species.

Lochmaea Weise, 1883

4. *Lochmaea capreae* Linnaeus, 1758

Material: seven specimens – one specimen, July 28, 2012, Bihor mountains; one specimen, July 29, 2013, Stâna de Vale; five specimens, July 30, 2013, Măgura Fericii.
Hostplants*: Salix* sp., *Populus* sp., *Betula* sp.
Geographical distribution: common presence in high hilly and mountain areas from Romania, but it is mentioned for the first time in Bihor. Palearctic species.

Xanthogaleruca Laboissiere, 1934

5. *Xanthogaleruca luteola* Muller, 1766

Material: six specimens – two specimens, July 3, 2010, Tinca; one specimen, August 20, 2015, Râpa forest; one specimen, June 26, 2010, Husasău de Tinca; one specimen, August 28, 2011, Ciumeghiu; one specimen, August 20, 2015, Miheleu.
Hostplants: *Ulmus* sp.
Geographical distribution: common species present in Romania, but it is for the first time mentioned for Bihor. Palearctic species.

Galeruca Muller, 1764

6. *Galeruca (Emarhopa) rufa* Germar, 1824

Material: seven specimens – three specimens, June 20, 2010, Tinca; one specimen, May 3, 2010, Husasău de Tinca; one specimen, July 5, 2011, Salonta; two specimens, June 20, 2013, Cociuba Mare.
Hostplants: *Convulvulus arvensis*.
Geographical distribution: common species present in plain and hilly areas from Romania, being mention in Bihor for the first time. Central-european species.

7. *Galeruca (Galeruca) pomonae* Scopoli, 1763

Material: 8 specimens – one specimen, June 20, 2010, Tinca; two specimens, July 4, 2011, Râpa; one specimen, May 3, 2010, Husasău de Tinca; one specimen, July 5, 2011, Salonta; one specimen, June 20, 2013, Cociuba Mare; one specimen, June 31, 2014, Şoimi; one specimen, July 27, 2015, Călacea.
Hostplants: *Centaurea* sp., *Scabiosa ochroleuca*, *Leontodon* sp., *Capsella bursa-pastoris*, *Cirsium* sp., *Phlox* sp.
Geographical distribution: common species in Romania, being mentioned for the first time in Bihor. European species.

8. *Galeruca (Galeruca) tanaceti* Linnaeus, 1758

Material: 20 specimens – 12 specimens collected during 2010-2014, Tinca; two specimens, June 6, 2010, Husasău de Tinca; one specimen, July 2, 2011, Salonta; one specimen, June 26, 2013, Pomezeu; one specimen, August 9, 2013, Cociuba Mare; one specimen, July 26, 2013, Budureasa; one specimen, June 20, 2014, Şoimi; one specimen, August 19, 2015, Ianoşda.
Hostplants: *Achillea millefolium*, *Cirsium* sp., *Chrysanthemum vulgare*.
Geographical distribution: common species in Romania, first mention in Bihor. Holarctic species.

9. *Galeruca (Haptocelis)melanocephala* Ponza, 1805

Material: one specimen, June 16, 2013, Tinca.
Host plants: *Rumex* sp., *Polygonum aviculare*.
Geographical distribution: rare species in Romania, mentioned for the first time in Bihor. Central-European species.

Galerucella Crotch, 1873

10. *Galerucella (Neogalerucella) lineola* Fabricius, 1784

Material: three specimens – one specimen, July 1, 2010, Tinca; one specimen, June 25, 2012, Râpa; one specimen, June 26, 2013, Miersig forest.
Host plants: *Salix viminalix*, *Corylus avellana*, *Alnus glutinosa*, *Populus* sp.
Geographical distribution: common presence in Romania, being mentioned for the first time in Bihor. European species.

11. *Galerucella* (*Neogalerucella*) *calmariensis* Linnaeus, 1707

Material: 13 specimens – 8 specimens, June 16, 2010, Tinca; two specimens, July 9, 2013, Râpa forest; one specimen, July 3, 2010, Husasău de Tinca; one specimen, July 19, 2013, Cociuba Mare; one specimen, June 26, 2013, Stâna de Vale.
Host plants: *Lythrum salicaria*.
Geographical distribution: common species in humid biotopes from Romania; in Bihor, the species was mentioned by SZEL et al. (1995). European species.

12. *Galerucella* (*Neogalerucella*) *pusilla* Duftschmid, 1825

Material: one specimen, June 17, 2013, Tinca.
Host plants*: Lythrum salicaria, Stachys palustris, Veronica* sp.
Geographical distribution: relatively common species in Romania, but it is for the first time mentioned for Bihor. Species presented in Europe and Asia Minor.

Luperus Geoffroy, 1762

13. *Luperus xanthopoda* Schrank, 1781

Material: two specimens - one specimen, May 29, 2012, Râpa; one specimen, July 14, 2013, Miheleu.
Host plants*: Ulmus* sp., *Prunus* sp., *Pyrus piraster*.
Geographical distribution: relatively rare species in Romania, mentioned for the first time in Bihor. Euro-Asian species.

Euluperus Weise, 1886

14. *Euluperus major* Weise, 1886

Material: one specimen, July17, 2012, Pomezeu.
Host plants: *Ulmus* sp., *Prunus* sp.
Geographical distribution: very rare species in Romania, being for the first time mentioned for Bihor. Central-European species, present also in Asia Minor.

From the point of view of the presence in different geographical units (plain, hill, mountain), the species of Galerucinae subfamily from Bihor County presents the next distribution (Table 1).

Table 1. The presence of Galerucinae subfamily from Bihor County in different relief units (original).

Name of species	Plain	Hill		Mountain
Dibrotica virgifera	X	X		
Agelastica alni	X	X		
Pyrrhalta viburni	X	X		
Lochmaea capreae				X
Xanthogaleruca luteola	X	X		
Galeruca rufa	X	X		
Galeruca pomonae	X	X		
Galeruca tanaceti	X	X		
Galeruca melanocephala	X			
Galerucella lineola	X	X		
Galerucella calmariensis	X	X		X
Galerucella pusilla	X			
Luperus xanthopoda	X	X		
Euluperus major		X		
Total species	12	11		2
%	85.71	78.57		14.28

This table shows that 12 species were identified in the plain area (85.71%), 11 species in the hilly area (78.57%) and 2 species in the mountainous area (14.28%). One species – *Lochmaea capreae* Wse. is typical to mountainous area. *Galerucella calmariensis* L., presents a large altitudinal distribution, roughly 1000-1700 meters.

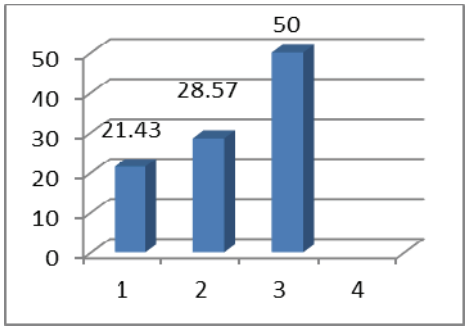
Depending on the nutritional spectrum, the species are grouped into three categories: monophagous, oligophagous and polyphagous species (Table 2).

Table 2. The nutritive spectrum of the species of Galerucinae subfamily from Bihor County.

Name of species	Nutritional category	Botanical family
Dibrotica virgifera	Monophagous	Poaceae
Agelastica alni	Oligophagous	Betulaceae
Pyrrhalta viburni	Oligophagous	Caprifoliaceae
Lochmaea capreae	Polyphagous	Salicaceae Betulaceae
Xanthogaleruca luteola	Oligophagous	Ulmaceae
Galeruca rufa	Monophagous	Convolvulaceae
Galeruca pomonae	Polyphagous	Asteraceae Brassicaceae
Galeruca tanaceti	Polyphagous	Apiaceae Asteraceae
Galeruca melanocephala	Oligophagous	Polygonaceae

Galerucella lineola	Polyphagous	Salicaceae Betulaceae
Galerucella calmariensis	Monophagous	Lythraceae
Galerucella pusilla	Polyphagous	Lythraceae Lamiaceae Scrophulariaceae
Luperus xanthopoda	Polyphagous	Ulmaceae Rosaceae
Euluperus major	Polyphagous	Ulmaceae Rosaceae

From the total number of the species, 7 (50%) are polyphagous, 4 species (28.57%) oligophagous and 3 species (21.42%) are monophagous (Fig. 1).



Legend: 1. Monophagous species, 2. Oligophagous species, 3. Polyphagous species.
Figure 1. The nutritive spectrum of the species of Galerucinae collected from Bihor County.

There were identified 14 botanical families as host plants of the beetles from the Galerucinae subfamily from Bihor County: Poaceae, Betulaceae, Caprifoliaceae, Salicaceae, Ulmaceae, Convolvulaceae, Asteraceae, Brassicaceae, Apiaceae, Polygonaceae, Lythraceae, Lamiaceae, Scrophulariaceae, Rosaceae (Table 2).

The relative big number of botanical families from this table proves the relative high biodiversity of the vegetation from the analyzed area.A big frequency in preferences of the Galerucinae subfamily from Bihor County have the following botanical families: Betulaceae, Salicaceae, Ulmaceae, Rosaceae and Lythraceae.The geographical position (central-east) of Romania in Europe and the position of Bihor County referred to national territory (north-western) determined the identification of a species with very varied framing: Holarctic, Palaearctic, European, Central-European, Euro-Asian and Asia Minor (Table 3).

Table 3. The zoogeographical distribution of the Galerucinae species from Bihor County.

Name of species	Geographical distribution
Diabrotica virgifera	Holarctic
Agelastica alni	Europe and Asia Minor
Pyrrhalta viburni	Europe
Lochmaea capreae	Palaearctic
Xanthogaleruca luteola	Palaearctic
Galeruca rufa	Central-European
Galeruca pomonae	European
Galeruca tanaceti	Holarctic
Galeruca melanocephala	Central-European
Galerucella lineola	European
Galerucella calmariensis	European
Galerucella pussila	Europe and Asia Minor
Luperus xanthopoda	Euro-Asian
Euluperus major	Europe and Asia Minor

It has been found that, between zoogeographical categories, it exists a relative balance: four European species (28.57%), three European and Asia Minor species (21.42%), two Holarctic species (14.28%) two Palaearctic species (14.28%), two Central-European species (14.28%) and one Euro-Asian species (7.14%).

The biotopes from Bihor County where the species of Galerucinae subfamily live are different from the humidity point of view. There were identified three kinds of species: 9 (64.28%) mesophyllous species, 3 (21.42%) – meso-hygrophyllous and 2 (14.28%) mesoxerophyllous species (Table 4).

Table 4. The distribution according to humidity preference of the Galerucinae species from Bihor County.

Name of species	Types of humidity of biotopes
Diabrotica virgifera	Mesophyll
Agelastica alni	Mesohygrophyll
Pyrrhalta viburni	Mesophyll

Lochmaea capreae	Mesophyll
Xanthogaleruca luteola	Mesophyll
Galeruca rufa	Mesoxerophyll
Galeruca pomonae	Mesophyll
Galeruca tanaceti	Mesophyll
Galeruca melanocephala	Mesophyll
Galerucella lineola	Mesoxerophyll
Galerucella calmariensis	Mesohygrophyll
Galerucella pussila	Mesohygrophyll
Luperus xanthopoda	Mesophyll
Euluperus major	Mesophyll

CONCLUSIONS

During five seasons (2010-2015), in Bihor County, there were identified 14 species of the Galerucinae subfamily, belonging to 9 genera.

From the total of Galerucinae, the polyphagous, European and mesophyllous species predominate.

ACKNOWLEDGEMENTS

Special thanks to Mr. Professor Mircea Varvara, "Al. I. Cuza" University of Iasi, for his constructive comments and publishing advice.

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Received: January 23, 2017
Accepted: March 31, 2017