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CETONIIDAE LEACH, 1815 (INSECTA: COLEOPTERA) FROM BOSNIA AND HERZEGOVINA

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Abstract

During the first decade of the 21st century, the authors have been continuously researching the family Cetoniidae Leach, 1815 in Bosnia and Herzegovina. Certain differences have been established compared to the data of previous research, specifically the data from the 20th century. In this work, revised and completed data are presented as well as a temporary distribution map for 17 species of the family Cetoniidae in Bosnia and Herzegovina.

The most important differences to point out are the following changes we made in order to harmonize the data on Cetonids of Bosnia and Herzegovina with modern systematics and nomenclature of this family: elevation of the subfamily of Cetoniinae to the family rank Cetoniidae; previously used synonym *Gnorimus octopunctatus* (Fabricius, 1775) was replaced by *G. variabilis* (Linnaeus, 1758); and the replacement of the name *Protaetia* (*Eupotosia*) *koenigi* (Reitter, 1894) by the name *P.* (*Eupotosia*) *mirifica* (Mulsant, 1842).

All the species mentioned in this paper had already been cited in the works of R. Mikšić, while in their research the authors confirmed 15 out of 17 species existing in Bosnia and Herzegovina.

KEY WORDS: Coleoptera, Cetoniidae, biodiversity, Bosnia and Herzegovina

Introduction

The research on the Cetonidae Leach, 1815 of Bosnia and Herzegovina began at the end of the 19th century (APFELBECK, 1912), but despite the large quantity of *coleopterological material collected by Austro-Hungarian experts* (V. Apfelbeck, O. Reiser, M. Hilf and A. Winneguth) in the first half of the 20th century, a very small number of works were published about Scarabaeidae (MIKŠIĆ, 1953). In the second half of the 20th century, thanks to intensive research by R. Mikšić, much more important results in this field were achieved, in the

region of Bosnia and Herzegovina, in the area of the whole Balkan Peninsula, and even in a part of the Palaearctic (MIKŠIĆ, 1950, 1953, 1954, 1957, 1958, 1962, 1965, 1970, 1976, 1977, 1982, 1987, KAŠIĆ-LELO & LELO, 2002; LELO, 2006a, 2006b). Besides Mikšić's work, *other authors' faunistic works appear* only sporadically, like the work of Sonja Ognjeva (married name Mikšić) who completed data on the fauna of dung beetles of Herzegovina (MIKŠIĆ, 1950; OGNJEVA, 1951). In the late 20th and early 21st century S. Lelo and M. Kašić continued to research the Cetonids intending to complete the data on the distribution of some species and to maintain the actuality of the data left by R. Mikšić in a series of his research (LELO & KAŠIĆ- LELO, 2009).

After the analysis of the literature data and long-standing work in the field, the qualitative structure of this group in Bosnia and Herzegovina is well known: 17 species from eight genera and three subfamilies are known.

Materials and Methods

The data on the family Cetonidae Leach, 1815 in Bosnia and Herzegovina were collected from available literature resources, primarily from the works of R. Mikšić (MIKŠIĆ, 1950, 1953, 1955, 1956, 1958, 1965, 1970, 1976, 1977, 1980, 1982, 1987) and from a small number of other researchers (APFELBECK, 1912; OGNJEVA, 1951), and from the research of the authors themselves (LELO, 2000, 2003, 2006a, 2006b, 2006-2007; LELO & KAŠIĆ-LELO, 2006a, 2006b, 2007; LELO & ŠKRIJELJ, 2001; KAŠIĆ-LELO, 2005; KAŠIĆ-LELO & LELO, 2002, 2005, 2007; KAŠIĆ-LELO *et al*., 2006).

Specimens from the private Zoological collection „Lelo" have been collected from 1996 to 2009 by various collectors at many sites in Bosnia and Herzegovina. The specimens were collected either by enthomological net or by hand (depending on circumstances), and after that put into flasks with acetyl alcohol (CH_3COOH and C_2H_5OH) at a ratio of 1:3. Material prepared in this way has been stored in special boxes for safe transportation and much easier storage (SCHMIDT, 1970, for example).

The locations where specimens exist, that is to say the items stored in the private Zoological collection „Lelo", are marked by the symbol „#", for example Ozren-Mt. (Orlovac#).

The current nomenclature and the taxonomic overview are coordinated with the data on the WEB portal Fauna Europaea (ALONSO-ZARAZAGA, 2007); the data control was done according to BARAUD (2001).

The temporary distribution maps were made on a blind contour of a B-H map using the software ArcView. The points with a white core represent literature data from previous researchers, and the black points represent the findings of the authors of this study. The grey map background represents species which are most probably present in the whole country, but not yet confirmed in all parts, while the maps with white background represent species which certainly inhabit only parts of Bosnia and Herzegovina.

Results and Discussion

After the analysis of the collected data on the Cetonids of Bosnia and Herzegovina, the existence of 17 species, classified in eight genera and three subfamilies, was established.

Nomenclatural and taxonomic data on the members of the family Cetoniidae Leach, 1815 of Bosnia and Herzegovina are presented in the following list of species.

Family Cetoniidae Leach, 1815

Subfamily Valginae Mulsant, 1842

Genus *Valgus* Scriba, 1790

1. *V. hemipterus* (Linnaeus, 1758)

Comment: This species is common and present everywhere in Bosnia and Herzegovina. It is known from the following locations in Bosnia and Herzegovina: Derventa, Drvar, Sijekovac, Čemerska-Mt. (Slivno[#]), Sarajevo (Bare[#], Grdonj[#]), Ozren-Mt. (Orlovac[#]), Ilidža, Igman-Mt., Trebević-Mt., Ivan-Mt., Pale, Pazarić, Babin Potok, Jablanica, Mostar (Sjeverni logor[#]), Nevesinje (Batković[#], Švrakino[#]), Stolac, Struga (near Čapljina) (Fig. 1) (Mikšić, 1953, 1965, 1970; Lelo, 2006b).

Subfamily Trichiinae Fleming, 1821

Tribus Osmodermini Schenkling, 1922

Comment: The species is listed as Osmodermatini on the portal Fauna Europaea (Alonso-Zarazaga, 2007).

Genus *Osmoderma* Serville, 1825 (Lepeletier & Serville, 1828)

2. *O. eremita* (Scopoli, 1763)

Comment: The species *Osmoderma lassallei* Baraud & Tauzin, 1991 (described from Greece) is reduced to subspecies rank on the portal Fauna Europaea, and, apparently, all populations of *O. eremita* Scopoli of the Balkan Peninsula are affiliated to the mentioned taxonomic category, an affiliation we consider very disputable (Alonso-Zarazaga, 2007). The species is represented in Bosnia and Herzegovina by the subspecies *O. e. lassallei* Baraud & Tauzin, 1991 and it is widely distributed, but with a very small number of individuals. It is known from the following locations in Bosnia and Herzegovina: Tuzla[(#)], Travnik, Vareš[(#)], Sarajevo, Igman-Mt., Ivan-Mt., Babin Potok, Višegrad (Fig. 2) (Mikšić, 1953, 1965, 1970; Lelo, 2006b; Lelo & Kašić-Lelo, 2006a).

Tribus Trichiini Ložek, 1956

Genus *Gnorimus* Serville, 1825

Comment: The genus was cited as *Gnorimus* Lepeletier & Serville, 1828 on the portal Fauna Europaea (Alonso-Zarazaga, 2007).

3. *G. nobilis* (Linnaeus, 1758)

Comment: This species is common in the continental part, and especially in the mountain areas of the country, but it avoids the Mediterranean areas. It is advisable to collect the adults in the period May-June on different flowers. It is known from the following locations in Bosnia and Herzegovina: Osječenica-Mt., Vranica (around Prokoško Lake[#]), Igman-Mt., Sarajevo, Ivan-Mt., Pazarić, Treskavica-Mt. (Kozja Luka), Kalinovik

(Ulog#), Podorašac, around Boračko Lake, Prenj-Mt. (Borke), Velež-Mt. (Lakat), Gacko (Fig. 3) (MIKŠIĆ, 1953, 1965, 1970; LELO, 2006b).

4. *G. variabilis* (Linnaeus, 1758)

Comment: R. Mikšić cited this species as *Gnorimus octopunctatus* (Fabricius, 1775). The species is rare in our regions. It is advisable to collect the adults in the period July-August in hollow trees, in damaged trees that leak juice and on different flowers. It is known from the following locations in Bosnia and Herzegovina: Derventa, Sarajevo, Babin Potok (Fig. 4) (MIKŠIĆ, 1953, 1965, 1970; LELO, 2006b).

Genus *Trichius* Fabricius, 1775

Comment: R. Mikšić cited this genus as *Trichius* Fabricius, 1787.

5. *T. fasciatus* (Linnaeus, 1758)

Comment: This species is common in the mountain regions of our country, but it avoids the Mediterranean areas. It is known from the following locations in Bosnia and Herzegovina: Osječenica-Mt., Konjuh-Mt. (Haluge#), Vran-Mt., Ivan-Mt., Vareš, Sarajevo, Trebević-Mt., Pale (Vlahovići), Treskavica-Mt. (Kozja Luka), Ravna-Mt., Bjelašnica-Mt. (Babin do), Prenj-Mt., Velež-Mt. (Lakat), Gacko (Fig. 5) (MIKŠIĆ, 1953, 1965, 1970; LELO, 2006b; LELO & KAŠIĆ-LELO, 2007).

6. *T. sexualis* Bedel, 1906

Comment: This species is common and present almost everywhere in our regions. It is known from the following locations in Bosnia and Herzegovina: Osječenica-Mt., Derventa, Majevica-Mt., around Lake Modrac#, Vareš, Breza (Župča#), Kiseljak, Sarajevo (urban zone#, Nahorevo hills#), Pale, Romanija-Mt.#, Trnovo#, Banja Stijena, Čelebić, Ilidža, Pazarić, Ivan-Mt., Jablanica, Prenj-Mt. (Rapte)#, Čvrsnica-Mt., Stolac, Gacko (Fig. 6) (MIKŠIĆ, 1953, 1965, 1970; LELO, 2006b; LELO & KAŠIĆ-LELO, 2007).

Subfamily Cetoniinae Leach, 1815

Tribus Cetoniini Leach, 1815

Subtribus Cetoniina Leach, 1815

Genus *Cetonia* Fabricius, 1775

7. *C. aurata* (Linnaeus, 1761)

Comment: This species is very common. It is known from the following locations in Bosnia and Herzegovina: Bihać, Bosanska Krupa#, Kozara-Mt., Motajica-Mt., Bosanski Brod (Sijekovac), Derventa, Maglaj#, Živinice#, Banovići#, Jajce#, Vranica-Mt.#, Breza#, Kakanj#, Zenica#, Vareš#, Zvijezda-Mt.#, Olovo#, Kiseljak (Bukovica#), Travnik, Čemerska-Mt. (village Mahmutovića Rijeka# near Ilijaš), Sarajevo#, Ozren-Mt. (Orlovac#, Nahorevo#, Donji Mrkovići#, Gornji Mrkovići#, Čavljak#, Bukovik#, Crepoljsko#), Pale#, Romanija-Mt. (village Bećari#, village Pediše# and Kramer village#), Igman-Mt., Bjelašnica-Mt., Banja Stijena, Rogatica#, Višegrad, Goražde (urban zone#, Rešetnica# and Pargani#), Ustibar#, Krug-Mt., Troglav – Dinara-Mt., Vaganj and Prolog (Livno), Krug-Mt., Osječenica-Mt., Buško-Blato#, Vran-Mt.#, Jablanica#, Prenj-Mt.#, Podorašac, Konjic#, around Boračko Lake, Treskavica-Mt. (Kozja Luka), Zelengora-Mt., Ivan-Mt., Visočica-Mt., Gacko, Baba-Mt., Bileća, Kravice (Ljubuški#), Čvrsnica-Mt.#, Drežnica#, Mostar#, Blagaj#, Domanovići, Počitelj#, Svitava#, Hutovo#, Hutovo

blato[#], Neum[#], Klek[#], Stolac[#], Nevesinje, Popovo polje (Bratogošac[#], Ravno[#], Zavala[#], Goisina[#], village Pećine[#], Kotezi[#], Grmljani[#], Hum[#]), Trebinje[#] (Fig. 7) (KAŠIĆ, 2005; KAŠIĆ-LELO & LELO, 2007; KAŠIĆ-LELO *et al*., 2006; LELO, 2006b).

Genus *Protaetia* Burmeister, 1842

Comment: J. Baraud elevates all the subgenera of the above-cited taxonomic category to generic rank with a comment that there is too large a number of *appertaining* species within this genus which was not accepted on the portal Fauna Europaea. Otherwise, R. Mikšić used to cite the members of this group within the genus *Potosia* Mulsant (it is correct: Mulsant & Rey, 1871) till 1970, and after that he cited the *appertaining* species as members of the above-cited taxonomic category (MIKŠIĆ, 1953, 1965, 1970; BARAUD, 2001; ALONSO-ZARAZAGA, 2007).

Subgenus *Cetonischema* Reitter, 1898

8. *P. aeruginosa* (Drury, 1770)

Comment: The species is cited as *Cetonischema aeruginosa* (Linnaeus, 1767) on the portal Fauna Europaea, a citation which we consider incorrect. The species is common and present everywhere in our regions and it is known from the following locations in Bosnia and Herzegovina: Bihać (Bedrenica[#]), Sanski Most, Motajica-Mt., Kralupi (Visoko[#]), Sarajevo, Ivan-Mt., Kalinovik, Repovci[#] (near Konjic), Galjevo[#] (near Konjica), around Boračko Lake (Paprasko[#]), Borke, Jablanica[#], Mostar, Domanovići, Stolac, Avtovac (Fig. 8) (MIKŠIĆ, 1953, 1965, 1970; LELO, 2006b).

Subgenus *Eupotosia* Mikšić, 1954

9. *P. affinis* (Andersch, 1797)

Comment: This species is common and present everywhere in our regions, but it is significantly frequent in the Mediterranean areas. It is known from the following locations in Bosnia and Herzegovina: Motajica-Mt., Kralupi (Visoko[#]), Jablanica[#], Domanovići, Stolac, Popovo polje (Zavala[#]) (Fig. 9) (MIKŠIĆ, 1953, 1965, 1970; LELO, 2006b).

10. *P. mirifica* (Mulsant, 1842)

Comment: R. Mikšić cited this species as *Protaetia* (*Eupotosia*) *koenigi* (Reitter, 1894). The species is generally very rare. It is known from the following locations in Bosnia and Herzegovina: Motajica-Mt., Domanovići (Fig. 10) (MIKŠIĆ, 1953, 1970).

11. *P. lugubris* (Herbst, 1786)

Comment: This species is rare in our regions and it avoids the Mediterranean areas. It is known from the following locations in Bosnia and Herzegovina: Sanski Most, Derventa, Čečevo, Vareš[#], Sarajevo (Fig. 11) (MIKŠIĆ, 1953, 1965, 1970; LELO, 2006b).

Subgenus *Netocia* Costa, 1852

Comment: J. Baraud considered the taxonomic category of *Netocia* Costa as a separate genus, and he classified all the *appertaining* species in Bosnia and Herzegovina in the subgenus *Potosia* Mulsant & Rey, 1971 (BARAUD, 2001). R. Mikšić cited the species of Bosnia and Herzegovina as members of the subgenus *Potosia* Mulsant and the genus *Protaetia* Burmeister (MIKŠIĆ, 1987), while on the portal Fauna Europaea, the

species of Bosnia and Herzegovina are cited within the subgenus *Netocia* Costa, 1852 (ALONSO-ZARAZAGA, 2007).

12. *P. angustata* (Germar, 1817)

Comment: This species is common in our Mediterranean area. It is known from the following locations in Bosnia and Herzegovina: Šehovina (near Mostar[#]), Mostar (Radobolje), Borke, Dračevo, Čapljina, Stolac, Trebinje, Hum, Popovo polje (Zavala[#]) (Fig. 12) (MIKŠIĆ, 1953, 1965, 1970, 1987; LELO, 2006b).

13. *P. cuprea* (Fabricius, 1775)

Comment: This species is common and present everywhere in our regions and it is represented by the subspecies *N. c. obscura* Andersch, 1797. It is known from the following locations in Bosnia and Herzegovina: Kozara-Mt., Sanski Most, Derventa, Siekovac, Čečevo, Novi Šeher[#], Tešanj[#], Kakanj[#], Visoko (Kralupi[#]), Olovo[(#)], Sarajevo[(#)], Igman-Mt., Jablanica, Mostar, Vitina, Čapljina, Stolac, Baba-Mt., Gacko, Popovo polje (Zavala[#], Goisina[#]) (Fig. 13) (MIKŠIĆ, 1953, 1965, 1970, 1987; LELO, 2006b).

14. *P. fieberi* (Kraatz, 1880)

Comment: This species is common and present everywhere in our regions, but it avoids the Mediterranean areas. It is known from the following locations in Bosnia and Herzegovina: Derventa, Čečevo, Solun (near Olovo[#]), Sarajevo (urban zone and Bare[#]), Župča (near Breza[#]), around Boračko Lake, Gacko (Fig. 14) (MIKŠIĆ, 1953, 1965, 1970, 1987; LELO, 2006b).

Subtribus Leucocelina Baraud, 2001

Comment: J. Baraud uses for the first time, to our knowledge, the above-mentioned taxonomic category but for the members of the genera *Oxythyrea* Mulsant, 1842 and *Paleira* Reiche, 1871 (BARAUD, 2001), while on the portal Fauna Europaea, the members of the genus *Epicometis* Burmeister, 1842 are classified under the mentioned subtribe too.

Genus *Tropinota* Mulsant, 1842

Comment: R. Mikšić cites two genera *Epicometis* Burmeister, 1842 and *Tropinota* Mulsant, 1842 (MIKŠIĆ, 1953, 1965) in his earlier works, but in his later works he cites only one genus (*Tropinota* Mulsant, 1842) with two subgenera: *Epicometis* Burmeister, 1842 and *Tropinota* Mulsant, 1842 (MIKŠIĆ, 1970, 1982).

Subgenus *Epicometis* Burmeister, 1842

15. *T. hirta* (Poda, 1761)

Comment: This species is common and present everywhere in our regions. It is advisable to collect the adults in the early spring on dandelions and other flowers. It is known from the following locations in Bosnia and Herzegovina: Bihać, Motajica-Mt., Derventa, Vlašić-Mt., Travnik, Breza (Župča[#]), Ilijaš[#], Sarajevo[#], Ozren-Mt.[#], Trebević-Mt., Babin Potok, Zelengora-Mt. (Palež), Jablanica, Čvrsnica-Mt. (Diva Grabovica), Mostar, Mostarsko Blato, Hutovo Blato, Čapljina, Stolac, Nevesinje, Bileća, Trebinje (Fig. 15) (MIKŠIĆ, 1953, 1965, 1970, 1987; LELO, 2006b).

Subgenus *Tropinota* Mulsant, 1842

16. *T. squalida* (Scopoli, 1783)

Comment: This species is common in our Mediterranean regions. It is known from the following locations in Bosnia and Herzegovina: Mostar (Kukavac#, Luka#, Polje#), Nevesinjsko polje (Batkovići#), Stolac#, Hum, Popovo polje (Zavala#), Trebinje, Neum# (Fig. 16) (Mikšić, 1953, 1965, 1970, 1987; Lelo, 2006b).

Genus *Oxythyrea* Mulsant, 1842

17. *O. funesta* (Poda, 1761)

Comment: This species is common and present everywhere in our regions. It is known from the following locations in Bosnia and Herzegovina: Motajica-Mt., Derventa, around jezera Modrac#, Gračanica#, Kotor Varoš#, Maglaj#, Novi Šeher#, Vareš#, Breza (Župča#), Ilijaš#, Olovo (urban zone#, Jelik#), Vogošća#, Sarajevo (Blekin potok#, Kromolj#, Sedrenik#, Pašino brdo#, Zmajevac#, Panjina kula#, Špicasta stijena#, Debelj#, Poljine#, Gornje Poljine#, Radava#, Nahorevska brda#, Kobilja Glava#, Žuč#, Radava#, Sokolović kolonija#), Trebević-Mt. (upper part of Bistrik#), Ozren-Mt. (Orlovac#, Gornji Mrkovići#, Donje Biosko#), Vučja Luka#, Romanija-Mt. (village Bećari#, village Pediše#), Ilidža#, Pale (Bistrica), Kalinovik (Ulog#), Ivan-Mt., around Boračkog jezera, Konjic, Doljani (beside Jablanica#), Mostar, Velež-Mt., Mostarsko Blato, Čapljina, Domanovići, Stolac, Gacko, Bileća, Popovo polje (Zavala#, Poljice#), Neum# (Fig. 17) (Mikšić, 1953, 1965, 1987; Lelo & Kašić-Lelo, 2005; Lelo, 2006b).

Conclusion

After an analysis of literature data and several years' work, we have ascertained that the family Cetoniidae is represented in Bosnia and Herzegovina by 17 species, eight genera and three subfamilies.

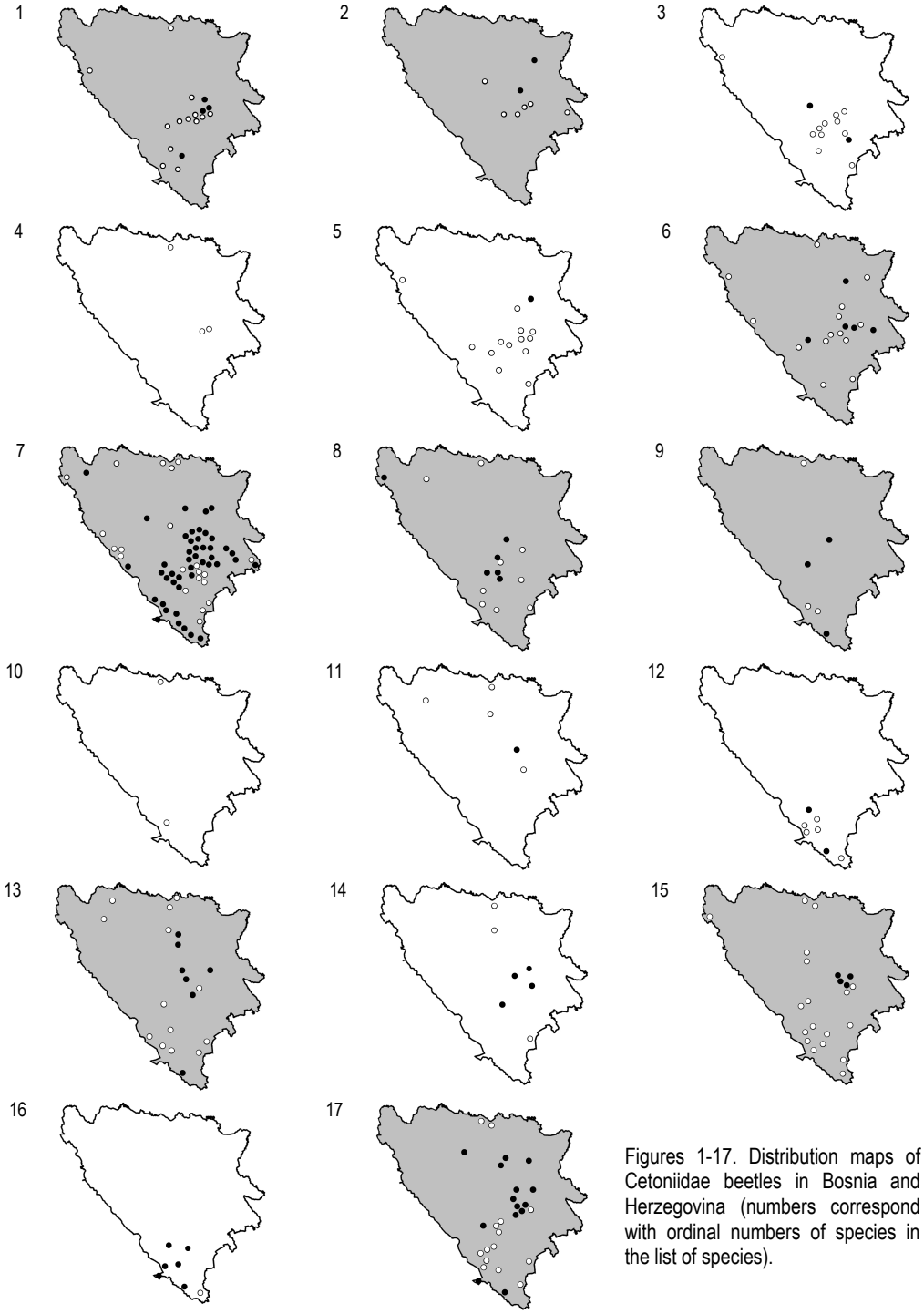
As the most important difference with regard to the previous data on Cetonids of Bosnia and Herzegovina, we can point the elevation of the subfamily Cetoniinae Leach (from the family Scarabaeidae) to the family rank of Cetoniidae Leach in order to harmonize these data with modern systematics of this family.

Baraud (2001) rejects the differentiation of the genus *Protaetia* Burmaister, 1842 with the subgenera *Cetonischema* Reitter, 1898, *Eupotosia* Mikšić, 1954, *Liocola* Thomson, 1859, *Potosia* Mulsant, 1871, and elevates the *appertaining* subgenera to genus rank with the exception of the subgenus *Potosia* Mulsant, 1871. Precisely, he sets *Netocia* Costa, 1852 as a genus name, and the *appertaining species leaves within the subgenus Potosia* Mulsant & Rey, 1871, changing in that way the data on their authors.

The name *Gnorimus octopunctatus* (Fabricius, 1775) is currently replaced by the name *G. variabilis* (Linnaeus, 1758), as well as the name *Protaetia* (*Eupotosia*) *koenigi* (Reitter, 1894) which is is currently replaced by the name *P.* (*Eupotosia*) *mirifica* (Mulsant, 1842).

The individuals of the species *Gnorimus variabilis* (Linnaeus, 1758) and *Protaetia mirifica* (Mulsant, 1842) were not found in our field research.

The representatives of the apparently very rare species *Protaetia mirifica* Mulsant in Bosnia and Herzegovina should be protected in the some way.



Figures 1-17. Distribution maps of Cetoniidae beetles in Bosnia and Herzegovina (numbers correspond with ordinal numbers of species in the list of species).

Still, this overview of species of the family Cetoniidae is basically identical to the previous overviews by R. Mikšić (Mikšić, 1970), and, with the exception of two of the appertaining species, the basic difference is revealed in a series of new findings of a large number of the *appertaining species*.

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CETONIIDAE LEACH, 1815 (INSECTA: COLEOPTERA) ИЗ БОСНЕ И ХЕРЦЕГОВИНЕ

Мирзета Кашић-Лело и Сувад Лело

Извод

Током прве деценије 21. века аутори су вршили истраживања распрострањења и фаунистичког састава фамилије Cetoniidae Leach, 1815 у Босни и Херцеговини. Извршене су одређене измене у односу на податке добијене током претходних истраживања (пре свега у 20. веку). У овом раду представљени су ревидирани и комплетирани подаци као и мапе распрострањења 17 врста из породице Cetoniidae у Босни и Херцеговини.

Најважније разлике у односну на претходне разултате истраживања су промене у именовању које су омогућиле усклађивање постојећих и нових података са савременом систематиком и номенклатуром породице Cetoniidae (претходно је сматрана подпородицом Cetoniinae у оквиру породице Scarabeidae). Име *Gnorimus octopunctatus* (Fabricius, 1775) је као млађи синоним замењено именом *Gnorimus variabilis* (Linnaeus, 1758), док је *Protaetia* (*Eupotosia*) *koenigi* (Reitter, 1894) замењено именом *Protaetia* (*Eupotosia*) *mirifica* (Mulsant, 1842).

Све врсте које се наводе у овом раду су већ биле забележене на територији Босне и Херцеговине у радовима Ренеа Микшића. Током својих теренских истраживања аутори су сакупили представнике 15 врста од укупно 17 врста које је забележио Микшић.

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