

**CARABIDAE, CERAMBYCIDAE AND SCARABAEOIDEA  
(Insecta: Coleoptera) FAUNA OF KORNAT, LAVSA AND ŽUT  
ISLANDS, CROATIA**

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Accepted: December 15<sup>th</sup> 2010

The Dalmatian coast and islands were mainly investigated by entomologists during the 19<sup>th</sup> and 20<sup>th</sup> centuries, but only few species were recorded for the beetle fauna of Kornati Islands, observed after a few sporadic and short-term studies. In 2009, members of the student organization “BIUS” carried out a faunistic survey of the islands Kornat, Žut and Lavsa in order to compile a more comprehensive species inventory of the families Carabidae, Cerambycidae and the superfamily Scarabaeoidea of these islands. Altogether 39 species belonging to the studied groups were found, 35 of them recorded on those islands for the first time. The most interesting was the record of *Parmena bicincta* Küster, 1849 (Cerambycidae), an endemic species of the Adriatic coast area. This is the first record of this species on Lavsa Island.

**Beetles, Carabidae, Cerambycidae, Scarabaeoidea, Kornati Islands, diversity**

T. KOREN, I. BURIC, B. LAUŠ, I. ROJKO, P. SVOBODA i L. ŠERIC JELASKA: Fauna skupina Carabidae, Cerambycidae i Scarabaeoidea (Insecta, Coleoptera) otoka Kornata, Lavse i Žuta, Hrvatska. Entomol. Croat. 2010., Vol. 14., Num. 3-4: 53-62.

Entomološka istraživanja u Dalmaciji i na jadranskim otocima provodila su se krajem 19. i početkom 20. stoljeća, no samo je manji broj vrsta zabilježen na Kornatskom otočju kao rezultat kratkotrajnih istraživanja. Tijekom 2009. godine članovi Sekcije za kornjaše studentske udruge BIUS uzorkovali su faunu kornjaša na otocima Kornatu, Žutu i Lavsi u cilju utvrđivanja faune trčaka (Carabidae), strizibuba (Cerambycidae) i natporodice Scarabaeoidea. Ukupno je zabilježeno 39 vrsta kornjaša, od čega je 35 vrsta po prvi put zabilježeno na istraživanim otocima. Faunistički najzanimljiviji nalaz je vrste *Parmena bicincta* Küster, 1849. iz porodice cvilidreta (Cerambycidae) koja pripada u endeme Jadranske obale, a na otoku Lavsi nije još bila zabilježena.

**Kornjaši, Carabidae, Cerambycidae, Scarabaeoidea, Kornatsko otočje, raznolikost**

## Introduction

At the beginning of the 19<sup>th</sup> and in the first half of the 20<sup>th</sup> century the Adriatic coast was systematically investigated by a number of entomologists, the most famous of them being *Depoli* (1924, 1938), Müller (1923, 1949-1953, 1957, 1959), Novak (1952, 1964, 1970), Mikšić (1951a, 1951b, 1955, 1956a, 1956b, 1958, 1960a, 1960b, 1971, Mikšić & G. 1971, 1973, Mikšić & K. 1985) and Durbešić (1967, 1968). All known records about beetle species of the Dalmatian coast and islands at that time were published in Novak's (1952), book. In his later publications Novak (1964, 1970) complemented his work with new findings of species in Dalmatia, counting altogether 3834 species. In recent years only a few articles have been published on the beetle species in Dalmatia and the Croatian islands (Vujčić-Karlo *et al.*, 1995a, Vujčić-Karlo & Durbešić, 2000). Data about the coleopteran fauna of the Kornati islands were reviewed by Vujčić-Karlo *et al.* (1995a) with a list of 43 species recorded for the Kornati islands. The low number of species and related publications indicate a poorly investigated area in the past, and there are no publications about the coleopteran fauna of the Island of Žut.

The Kornati islands are situated along the central part of the eastern Adriatic coast, between the Zadar and Šibenik archipelagos (Friganović, 1995) and are composed of over 140 islands and islets on an area covering 232.40 km<sup>2</sup> (Kulušić, 1965). These islands can be aligned into four smaller groups, regarding their direction and geographic position. Those are the Upper Kornati islands with two

groups (Žut and Sit with neighbouring small islands), and the Lower Kornati islands with another two groups (Kornat and Piškera with neighbouring islands). The islands of Kornat (32.44 km<sup>2</sup>) and Žut (14.82 km<sup>2</sup>) are the largest in this archipelago.

The Kornati islands can be characterized as having an anthropogenic landscape. In the past, these islands were covered with holm oak forests (*Quercus ilex* L.), which were then degraded to pastures on lithosols over the following centuries, to gain more areas for raising livestock. Today, there is a significant difference in vegetation in the islands of Žut and Kornat. Although sharing the same past (deforestation), mostly bare karstic hills prevail on Kornat island, with rocky ground, low and sparse vegetation, and just a few oases in the landscape (olive groves and vineyards). Žut island is still covered with pastures on lithosol, but with scrub, and several groves of holm oak, and even Aleppo pine trees (*Pinus halepensis* Mill.). Additionally there are olive groves with scattered fig and almond trees on Kornat and Žut (Matić et al., 2001).

Our goal was to investigate the coleopteran families Carabidae, Cerambycidae and the superfamily Scarabaeoidea of the Kornati islands in order to create a species list that can be used as a baseline for future studies of that area.

## Material and Methods

The Kornati islands were surveyed during April, May and September of 2009. Altogether 18 field days were spent on the islands: 11 days on the island Kornat, 7 days on the island Žut, and 2 days on Lavsa. We selected 26 locations on Žut (Fig. 1), 6 locations on Kornat and one location on Lavsa (Fig. 2). During the research approximately 530 coleopteran specimens were collected from the islands. Geographic coordinates of each locality were taken with a Garmin e-trex Vista GPS device. The position and coordinates of each location are given in Tab. 1.

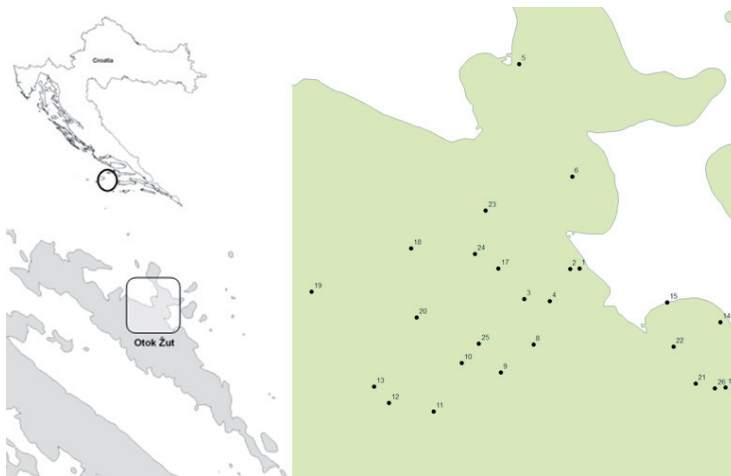


Figure 1. Map with the position of the studied localities on Žut island.  
Slika 1. Prikaz istraživanih lokaliteta na otoku Žut.



Figure 2. Map of localities on islands Kornat and Lavsa.  
Slika 2. Prikaz istraživanih lokaliteta na otocima Kornat i Lavsa.

Table 1. Number, coordinates, UTM field and description of investigated localities

Tablica 1. Broj, koordinate, UTM polja i opis istraživanih lokaliteta.

Žut Island	X	Y	UTM	Locality description
1	5526301	4858101	WJ25	Dragašina village, near the house
2	5526258	4858100	WJ25	field
3	5526051	4857963	WJ25	olive grove
4	5526166	4857955	WJ25	olive grove
5	5526027	4859021	WJ25	karst field (near Strunac)
6	5526268	4858515	WJ25	green field
7	5226209	4858406	WJ25	low bushes and short grass
8	5526092	4857759	WJ25	karst field
9	5525944	4857634	WJ25	wall and nearby bushes
10	5525765	4857676	WJ25	rocks and bushes
11	5525639	4857458	WJ25	green field
12	5525435	4857496	WJ25	green field
13	5525368	4857569	WJ25	green field
14	5526941	4857860	WJ25	rocky sea shore
15	5526727	4858038	WJ25	bushes and pine trees
16	5526964	4857566	WJ25	olive grove
17	5525933	4858102	WJ25	olive grove
18	5525536	4858192	WJ25	bushes and pine trees
19	5525083	4857997	WJ25	rocky top of the hill
20	5525561	4857881	WJ25	karst field near cypress trees
21	5526829	4857583	WJ25	pine grove
22	5526728	4857750	WJ25	meadow and cypress trees
23	5525875	4858363	WJ25	bushy sea shore
24	5525825	4858166	WJ25	olive grove and fig trees
25	5525844	4857763	WJ25	<i>Q. ilex</i> grove
26	5526917	4857562	WJ25	olive grove and cypress trees
Kornat Island	X	Y	UTM	Locality description
K1	5524785	4852286	WJ25	karst field
K2	5524993	4853046	WJ25	karst field
K3	5524156	4853800	WJ25	green karst field
K4	5523660	4854148	WJ25	karst field
K5	5523682	4853450	WJ25	karst field
K6	5524252	4853054	WJ25	karst field
Kornat Island	X	Y	UTM	Locality description
L1	5529776	4845283	WJ25	rocky pasture

Insects were collected using different methods (Chatenet, 2000) including hand collecting, sweep netting, pitfall traps and light traps. Identification was performed with the use of several keys (Reitter, 1908-1916, Mikšić & Georgijević, 1971b, 1973, Mikšić & Korpič, 1985, Chinery, 1997, Bense, 1995, Chatenet, 2000) and the collections of the Natural History Museum (Novak, Koča and Mikšić collections) were also consulted. The systematic list was made using the web page of FAUNA EUROPAEA (2004) with minor modifications.

## Results and discussion

Altogether 39 species belonging to the families Carabidae and Cerambycidae and the superfamily Scarabaeoidea were collected. The list of the collected species with the number of specimens per island is given in Tab. 2.

Table 2. List of species belonging to the families Carabidae, Cerambycidae and the superfamily Scarabaeoidea with the number of specimens on each island.

Tablica 2. Popis vrsta pripadnika porodica Carabidae, Cerambycidae i natporodice Scarabaeoidea s prikazom broja jedinki na svakom otoku.

Family	Tribus	Species	Žut	Kornat	Lavsa	
Carabidae	Cicindelinae	<i>Cicindela campestris</i> Linnaeus, 1758	3			
		<i>Cicindela littoralis</i> Fabricius, 1787	5			
	Carabinae	<i>Ophonus sabulicola</i> (Panzer, 1796)		1		
	Pterostichinae	<i>Molops elatus</i> (Fabricius, 1801)		1		
		<i>Poecilus koyi</i> (Germar, 1824)		1		
	Platyninae	<i>Laemostenus janthinus</i> (Duftschmid, 1812)		3		
	Harpalinae	<i>Acinopus laevigatus</i> Ménétries, 1832		1		
		<i>Acinopus picipes</i> (Olivier, 1795)		4		
		<i>Cryptophonus melancholicus</i> (Dejean, 1829)			3	
		<i>Dicheirotichus pallidus</i> (Dejean, 1829)		2		
Cerambycidae	Cerambycinae	<i>Clytus rhamni</i> Germar, 1817	7			
		<i>Stenopterus rufus</i> (Linnaeus, 1767)	6			
		<i>Phymatodes testaceus</i> (Linnaeus, 1758)	3			
	Lamiinae	<i>Agapanthia cynarae</i> (Germar, 1817)	4			

Table 2. Continued

Tablica 2. Nastavak

Family	Tribus	Species	Žut	Kornat	Lavsa
		<i>Dorcadion arenarium</i> (Scopoli, 1763)	6		
		<i>Herophila tristis</i> (Linnaeus, 1767)	5		
		<i>Parmena bicincta</i> Küster, 1849			1
	Lepturinae	<i>Stenurella bifasciata</i> (O.F.Mueller, 1776)	12		
		<i>Stictoleptura cordigera</i> (Fuessly, 1775)	3		
Lucanidae		<i>Dorcus parallelipipedus</i> (Linnaeus 1758)	3		
Cetoniidae	Cetoniinae	<i>Cetonia aurata</i> (Linnaeus, 1760)	41	2	
		<i>Protaetia cuprea</i> (Fabricius, 1775)	6		
		<i>Oxythyrea funesta</i> (Poda, 1761)	6	3	
		<i>Tropinota hirta</i> (Poda, 1761)	3	2	1
	Trichiinae	<i>Trichius sexualis</i> Bedel, 1906	1		
Melolonthidae	Chasmatopterinae	<i>Haplidia transversa</i> (Fabricius, 1801)	5		
	Sericinae	<i>Omalopia marginata</i> (Fuessly, 1775)	5		
		<i>Serica brunnea</i> (Linnaeus, 1758)	3		
Rutelidae	Rutelinae	<i>Anisoplia agricola</i> (Poda, 1761)	2		
Scarabeidae	Scarabaeinae	<i>Bubas bison</i> (Linnaeus, 1767)	11	2	
		<i>Scarabaeus variolosus</i> Fabricius, 1787		2	
		<i>Euonthophagus amyntas</i> (Olivier, 1789)		2	
	Coprinae	<i>Onthophagus furcatus</i> (Fabricius, 1781)	9	9	
		<i>Onthophagus lemur</i> (Fabricius, 1781)	11	5	1
		<i>Sisyphus schaefferi</i> (Linnaeus, 1758)	5	3	
		<i>Gymnopleurus geoffroyi</i> (Fuessly, 1775)	2	1	
Trogidae		<i>Trox scaber</i> (Linnaeus, 1767)	10		
		<i>Trox hispidus</i> Pontoppidan, 1763	3		
Geotrupidae	Geotrupinae	<i>Jekelius brullei</i> (Jekel, 1866)	3	2	

The largest number of species, 31, was found on Žut Island, followed by Kornat and Lavsa islands with 16 and 3 species, respectively. Only four species were known to occur on Kornat Island from previous studies: *Cetonia aurata* (Linnaeus, 1760), *Euonthophagus amyntas* (Olivier, 1789), *Jekelius brullei* (Jekel, 1866) and *Dorcadion arenarium* (Scopoli, 1763). All other species are recorded for the first time.

Overall, 24 specimens of Carabidae belonging to 10 species were collected. *Cicindela campestris* was found in different habitats including karst fields, paths and meadows but never on the rocks along the shore, while *Cicindela littoralis* was found only on the rocks within a two meter wide zone from the sea. Although both species can be found one meter from each other, it seems that they avoid another.

Longhorn beetles (Cerambycidae) were represented on the above mentioned islands by 9 species and 47 individuals. The most numerous longhorn beetles were flower-visiting species such as *Clytus rhamni* Germar, 1817, *Stenopterus rufus* (Linnaeus, 1767) and *Stenurella bifasciata* (O.F. Mueller, 1776). Faunistically, the most interesting was the finding of the small ground longhorn beetle, *Parmena bicincta* Küster, 1849, collected on Lavsa Island only. *P. bicincta* is one of the rare species endemic to the Adriatic coast. It is distributed only along the coastal area of Dalmatia, Montenegro and Albania (Bense, 1995).

The superfamily Scarabaeoidea was represented by 20 species belonging to 7 families on the Kornati islands. Due to the high numbers of livestock (sheep, goat and donkeys) on the islands, the diversity of dung-feeding beetles is also high. Eight species can be identified as coprophagous (dung feeding), with *Euonthophagus amyntas* (Olivier, 1789) being found in the largest number of locations and with highest number of specimens. *Cetonia aurata* (Linnaeus, 1760), *Tropinota hirta* (Poda, 1761) and *Onthophagus lemur* (Fabricius, 1781) were the only species present on all three islands.

Our list of species could be used as a basis for further studies including conservation issues, diversity analyses of Adriatic islands and so on. Further research efforts should be aimed at completing the list of coleopteran species of the islands Kornat, Lavsa and Žut and researching into the beetle fauna on the small surrounding islands.



## Acknowledgments

We would like to thank the members of the student organization “BIUS” for field assistance. Special thanks are due to the curator of the Natural History Museum, Branimir Gjurašin, for help with the identification of species.

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