

The Diversity of the Family Chrysomelidae (Insecta: Coleoptera) of the Obedska Bara Special Nature Reserve (Vojvodina Province, Serbia), with Special Reference to the Host Plants

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Abstract: Family Chrysomelidae, one of the largest phytophagous groups of insects, is very poorly studied in Serbia. During 11 years (2001-2011) the species of this family were studied in a protected area – Obedska Bara Special Nature Reserve. Obedska Bara is taken as a typical example of a wet habitat in Serbia and is characterized by a complex assembly of aquatic, wetland, meadow, and forest phytocenoses. In this area 73 species of Chrysomelidae from 31 genera and 10 subfamilies were identified. Two species are distinguished as new for the fauna of Serbia. According to zoogeographical analysis, the species can be classified into 10 chorotypes of Holarctic and three chorotypes of Europe. Notes on plants from which the insects were collected and observations in nature provide information related to a preference of Chrysomelidae members in nutrition and host plants of the examined species. Economically important species occurring as crop pests are also identified and briefly discussed.

Key words: Chrysomelidae, Coleoptera, diversity, distribution, Northern Serbia, pest species, host plants

Introduction

Chrysomelidae is a phytophagous group of insects and one of the largest families of Coleoptera order. In the world there are over 38 000 species (SEENO, WILCOX 1982). The recent catalogue of Palaearctic Coleoptera Vol. 6 listed the existence of 28 560 taxa within the superfamily Chrysomeloidea (including Cerambycidae and Bruchinae as subfamily of Chrysomelidae) (LÖBL, SMETANA 2010). Within the family Chrysomelidae 20 subfamilies are usually identified (SUZUKI 1996). The Chrysomelidae fauna of Serbia is relatively poorly studied. In addition to numerous faunistic works which are based on researches of all groups of insects of an area, most attention has been paid to certain economical-

ly significant species of the family Chrysomelidae (JOVANIĆ 1962, NONVEILLER 1960, 1978, ŽIVOJINOVIĆ 1963, ŽIVOJINOVIĆ, TOMIĆ 1956). So far 406 species from 74 genera and 13 subfamilies of Chrysomelidae have been noted in Serbia (AUDISIO 2012, GAVRILOVIĆ, ČURČIĆ 2011). Analysing the insect fauna in the area of Obedska Bara, TRIPKOVIĆ-ČUBRILOVIĆ (1960) established the presence of the 11 chrysomelid species from eight genera and four subfamilies. This was until recently the only entomological study conducted in the studied area.

Obedska Bara is a moist habitat, an abandoned meander of Sava River, which is located in the south-eastern part of Srem in the Autonomous Province of

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Vojvodina (Northern Serbia). It has the status of a Special Nature Reserve and is on UNESCO's list of internationally important wet habitats (Ramsar area). It represents the oldest protected area in Serbia (since 1874). It is characterized by a complex assembly of aquatic, wetland, meadow, and forest phytocoenoses.

The main task of this paper is to present the diversity of species of the family Chrysomelidae in the broader area of Obedska Bara, which is taken as a typical example of a wet habitat in Serbia. Plants from which the insects were collected are mentioned either in terms of primary or secondary host plants (cases of allotrophy) or the random findings. Types of vegetation from which the insects were collected have been described. Information on feeding of chrysomelid species on certain plant families derived from literature sources and personal observations in nature (JOLIVET, HAWKESWOOD 2005, NONVEILLER 1960, 1978). Economically important species of Chrysomelidae are particularly singled out.

Material and Methods

The studied entomological material was collected in the period from 2001 to 2011. The insects were collected from vegetation of more than 15 habitats in the area of Obedska Bara. The method of hand catching was most frequently used. This method proved to be the most suitable because the great attention had been paid to trophic relationships between insects and plants that they feed on. Small species were collected by aspirators. Entomological net was used for capture of the species that can quickly escape by flying or jumping (e.g., some Alticinae). For collecting of aquatic species of Chrysomelidae somewhat different entomological net was used (of smaller diameter of frame, with a shorter net and a shorter handle). The shaking method was used for species that occur on woody and shrubby plants.

Insects were killed in glass bottles by ethyl acetate and stored as dry preparations on entomological pins or glued on sample cards. Stereomicroscope Carl Zeiss STEMI 2000-C with independent lighting Schott KL1500 LCD was used for analysing the material. Material identification was performed using the key WARCHALOWSKI (2003). The first author of the study personally collected and identified the entire material. The material is deposited in his private collection.

Using GPS device Garmin Dakot 20, precise

locations were determined from which the insect specimens were collected. Positions of the studied sites of Obedska Bara are shown on the UTM map of Serbia (Fig. 1).

Results and Discussion

The presence of 73 species of Chrysomelidae from 31 genera and 10 subfamilies has been identified in the Obedska Bara Special Nature Reserve. The largest is the subfamily Alticinae that includes 31 species (42.46% of the total number of registered species) from 11 genera (35.485% of the total number of registered genera). In the subfamily Cassidinae, four species (5.48%) belong to a single genus – *Cassida* Linnaeus, 1758 (3.225%). Chrysomelinae are represented by 14 species (19.18%) from seven genera (22.58%). Clytrinae include six species (8.22%) from three genera (9.68%). Criocerinae are represented by four species (5.48%) from three genera (9.68%). Five species (6.85%) of the subfamily Cryptocephalinae belong to a single genus – *Cryptocephalus* Geoffroy, 1762 (3.225%). Two species (2.74%) of the genus *Donacia* Fabricius, 1775 (3.225%) of Donaciinae have been observed. Both Hispinae and Eumolpinae are represented by one species each (1.37% of the total number of species and 3.225% of the total number of genera each). Galerucinae include five species (6.85%) from two genera (6.45%) (Fig. 2).

In the area of the Obedska Bara Special Nature Reserve aquatic, wetland, meadow, and forest phytocoenoses are present. Poplar and willow forests dominate, while oak trees can be found along the edge. A variety of herbaceous vegetation is present along the marsh and on the moist meadows. In the entire northern part, stretching from Obrež to Kupinovo villages, there is an area of arable land. In the broader area of Obedska Bara about 220 species of vascular plants were noted (GAJIĆ, KARADŽIĆ 1991). Chrysomelids were collected from totally 88 plant species from 73 genera and 28 families (Table 1). The greatest number of species of Chrysomelidae was collected from plants of the families Salicaceae (17 species), Lamiaceae (12 species), and Asteraceae (11 species). Alticinae were mostly collected from the plants belonging to the family Brassicaceae. Within Cassidinae, *Cassida viridis* LINNAEUS, 1758 is the most common species that was captured on various Lamiaceae. Chrysomelinae were usually

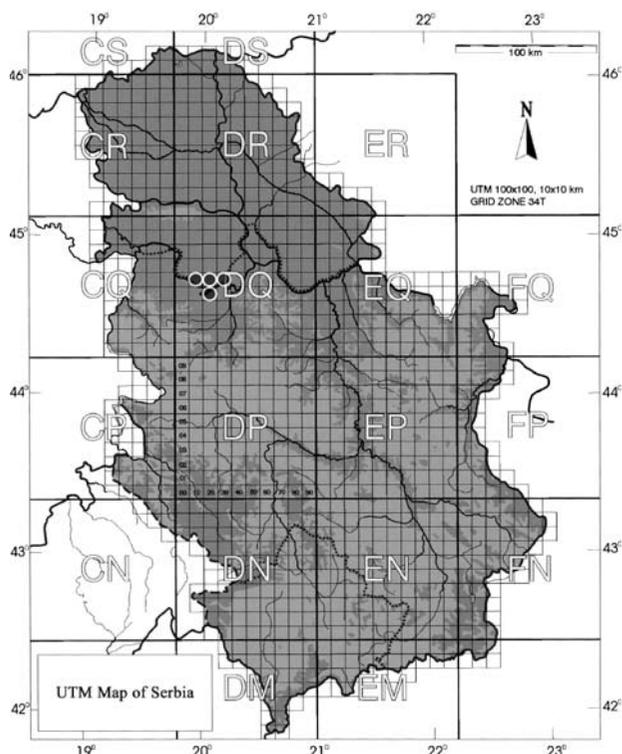


Fig. 1. UTM map of Serbia with marked sectors that encompass the area of the Obedska Bara Special Nature Reserve (DQ 15, DQ 24, DQ 25, and DQ 35).

collected from Lamiaceae and Salicaceae. Species of the genus *Chrysolina* Motschulsky, 1860 were mainly collected from Lamiaceae (herbaceous vegetation along edges of forests or in the clearings), while *Chrysomela populi* Linnaeus, 1758, *C. vigintipunctata* Scopoli, 1763, *Phratora vulgatissima* (Linnaeus, 1758), and *Plagioderma versicolora* (Laicharting, 1781) were associated in the nutrition with Salicaceae. Clytrinae mainly fed on plants of

the family Salicaceae as well. Criocerinae were mostly collected from Poaceae, often from grain fields. Cryptocephalinae were mostly captured in meadows, where their adults fed on pollen of flowers. Specimens of two aquatic species of the subfamily Donaciinae (*Donacia crassipes* Fabricius, 1775 and *D. marginata* Hoppe, 1795) were collected from the surface of the marsh, mostly from leaves of *Nymphaea alba* L. (Nymphaeaceae). Specimens of the species *Pales ulema* (Germar, 1813) (subfamily Eumolpinae) were collected in meadows, where the adults probably fed on pollen. Most of the collected species of Galerucinae were caught near the marsh, from the emergent and floating vegetation. Species of the genus *Galerucella* Crotch, 1873 were collected from plants of the families Lythraceae, Salicaceae, and Nymphaeaceae. Species *Hispa atra* Linnaeus, 1767 from the subfamily Hispinae was registered on *Equisetum arvense* L. (Equisetaceae), but it was not observed that the adults fed on the plant. Species of the genus *Hispa* LINNAEUS, 1767 usually feed on plants of the family Poaceae (JOLIVET, HAWKESWOOD 1995).

In Obedska Bara the presence of 14 potentially harmful chrysomelid species was established. *Altica quercetorum* FOU DRAS, 1860 appears as a pest of oak trees. In 2006 and 2009 a slightly larger number of individuals of this species was noticed on *Quercus robur* L., but the leaf damage was insignificant. *Chaetocnema tibialis* (Illiger, 1807) can damage the leaves of *Beta vulgaris* L. and *Spinacia oleracea* L. (Chenopodiaceae). Around Obedska Bara specimens of this chrysomelid species were seen on

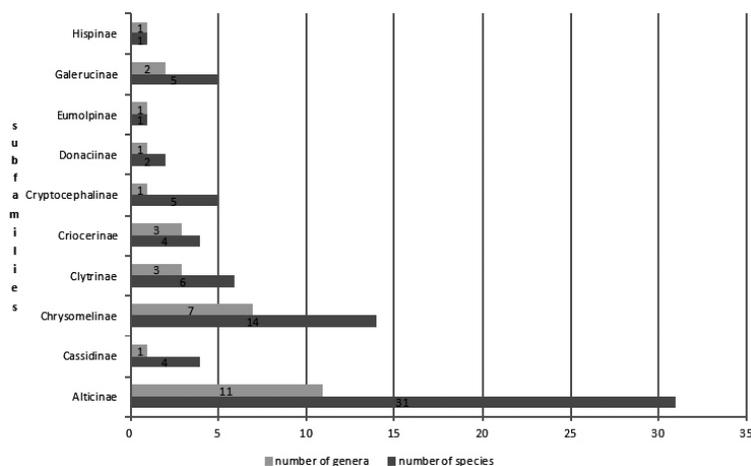


Fig. 2. Number of species and genera within the subfamilies of Chrysomelidae in the Obedska Bara Special Nature Reserve.

Table 1. Overview of identified species of Chrysomelidae in Obedska Bara and the list of plants from which the insects were captured.

Registered species	Plants from which the insects were collected
Subfamily ALTICINAE	
<i>Altica quercetorum</i> Foudras, 1860	<i>Quercus robur</i> L. (Fagaceae); <i>Plantago lanceolata</i> L. (Plantaginaceae); <i>Triticum aestivum</i> L. (Poaceae)
<i>Aphthona flava</i> Guillebeau, 1894	<i>Euphorbia</i> sp. (Euphorbiaceae); <i>Ficaria verna</i> Huds. (Ranunculaceae)
<i>Aphthona nigriceps</i> (Redtenbacher, 1842)	<i>Carex</i> sp. (Cyperaceae); <i>Lythrum salicaria</i> L. (Lythraceae)
<i>Aphthona nonstriata</i> Goeze, 1777	<i>Crepis paludosa</i> (L.) Moench (Asteraceae); <i>Iris pseudacorus</i> L. (Iridaceae)
<i>Aphthona pallida</i> (Bach, 1856)	<i>Geranium</i> sp. (Geraniaceae); <i>Lycopus europaeus</i> L. (Lamiaceae)
<i>Chaetocnema tibialis</i> (Illiger, 1807)	<i>Amaranthus retroflexus</i> L. (Amaranthaceae); <i>Beta vulgaris</i> L., <i>Chenopodium album</i> L., <i>Spinacia oleracea</i> L. (Chenopodiaceae); <i>Persicaria mitis</i> (Schrank) Assenov, <i>Rumex hydrolapathum</i> Huds. (Polygonaceae)
<i>Crepidodera aurata</i> (Marsham, 1802)	<i>Salix alba</i> L., <i>S. cinerea</i> L., <i>Populus alba</i> L., <i>Populus × canadensis</i> Moench (Salicaceae)
<i>Crepidodera fulvicornis</i> (Fabricius, 1792)	<i>Galium verum</i> L. (Rubiaceae); <i>Populus alba</i> L., <i>Salix cinerea</i> L. (Salicaceae)
<i>Crepidodera nigricoxis</i> Allard, 1878	<i>Salix alba</i> L. (Salicaceae)
<i>Crepidodera plutus</i> (Latreille, 1804)	<i>Populus alba</i> L., <i>Populus × canadensis</i> Moench (Salicaceae)
<i>Epitrix pubescens</i> (Koch, 1803)	<i>Brassica napus</i> L. (Brassicaceae); <i>Anemone nemorosa</i> L. (Ranunculaceae); <i>Solanum dulcamara</i> L., <i>S. nigrum</i> L. (Solanaceae)
<i>Longitarsus bertii</i> Leonardi, 1973	<i>Lamium</i> sp., <i>Mentha</i> sp. (Lamiaceae); <i>Anemone nemorosa</i> L. (Ranunculaceae); <i>Cydonia oblonga</i> Mill., <i>Malus domestica</i> Borkh. (Rosaceae)
<i>Longitarsus ferrugineus</i> (Foudras, 1860)	<i>Mentha aquatica</i> L. (Lamiaceae)
<i>Longitarsus minimus</i> Kutschera, 1863	<i>Mentha aquatica</i> L. (Lamiaceae); <i>Plantago major</i> L. (Plantaginaceae)
<i>Longitarsus pratensis</i> (Panzer, 1794)	<i>Plantago major</i> L. (Plantaginaceae)
<i>Longitarsus substriatus</i> Kutschera, 1863	<i>Mentha</i> sp. (Lamiaceae)
<i>Neocrepidodera nigrifolia</i> (Gyllenhal, 1813)	<i>Populus × canadensis</i> Moench (Salicaceae)
<i>Phyllotreta atra</i> (Fabricius, 1775)	<i>Rorippa amphibia</i> (L.) Besser (Brassicaceae)
<i>Phyllotreta christinae</i> Heikertinger, 1941	<i>Brassica napus</i> L., <i>Rorippa amphibia</i> (L.) Besser (Brassicaceae)
<i>Phyllotreta cruciferae</i> (Goeze, 1777)	<i>Brassica napus</i> L., <i>B. oleracea</i> L. (Brassicaceae); <i>Ficaria verna</i> Huds. (Ranunculaceae)
<i>Phyllotreta diademata</i> Foudras, 1860	<i>Brassica napus</i> L. (Brassicaceae)
<i>Phyllotreta dilatata</i> Thomson, 1866	<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande (Brassicaceae)
<i>Phyllotreta punctulata</i> (Marsham, 1802)	<i>Rorippa amphibia</i> (L.) Besser (Brassicaceae)
<i>Phyllotreta undulata</i> Kutschera, 1860	<i>Rorippa amphibia</i> (L.) Besser (Brassicaceae)
<i>Podagrica malvae</i> (Illiger, 1807)	<i>Alcea biennis</i> Winterl, <i>Malva sylvestris</i> L. (Malvaceae)
<i>Podagrica menetriesi</i> (Faldermann, 1837)	<i>Malva sylvestris</i> L. (Malvaceae)
<i>Psylliodes affinis</i> (Paykull, 1799)	<i>Solanum dulcamara</i> L. (Solanaceae)
<i>Psylliodes chalcomerus</i> (Illiger, 1807)	<i>Plantago lanceolata</i> L. (Plantaginaceae); <i>Poa</i> sp. (Poaceae)
<i>Psylliodes cupreatus</i> (Duftschmid, 1825)	<i>Solanum dulcamara</i> L. (Solanaceae)
<i>Psylliodes dulcamarae</i> (Koch, 1803)	<i>Solanum dulcamara</i> L. (Solanaceae)
<i>Sphaeroderma testaceum</i> (Fabricius, 1775)	<i>Bidens</i> sp., <i>Carduus acanthoides</i> L. (Asteraceae)
Subfamily CASSIDINAE	
<i>Cassida hemisphaerica</i> Herbst, 1799	<i>Silene latifolia</i> Poiret (Caryophyllaceae)
<i>Cassida nobilis</i> Linnaeus, 1758	<i>Silene latifolia</i> Poiret (Caryophyllaceae)
<i>Cassida rubiginosa</i> Müller, 1776	<i>Centaurea jacea</i> L., <i>Serratula tinctoria</i> L. (Asteraceae)
<i>Cassida viridis</i> Linnaeus, 1758	<i>Ajuga reptans</i> L., <i>Lamium</i> sp., <i>Mentha aquatica</i> L., <i>M. sp.</i> , <i>Stachys palustris</i> L. (Lamiaceae)

Table 1. Continued.

Registered species	Plants from which the insects were collected
Subfamily CHRYSOMELINAE	
<i>Chrysolina chalcites</i> (Germar, 1824)	<i>Lamium</i> sp. (Lamiaceae); <i>Urtica dioica</i> L. (Urticaceae)
<i>Chrysolina fastuosa</i> (Scopoli, 1763)	<i>Calamintha nepeta</i> (L.) Savi, <i>Galeopsis speciosa</i> Mill., <i>Mentha</i> sp., <i>Lamium album</i> L., <i>L.</i> sp., <i>Leonurus cardiaca</i> L. (Lamiaceae)
<i>Chrysolina graminis</i> (Linnaeus, 1758)	<i>Lactuca serriola</i> L. (Asteraceae); <i>Glechoma hirsuta</i> Waldstein & Kitaibel (Lamiaceae)
<i>Chrysolina haemoptera</i> (Linnaeus, 1758)	<i>Plantago lanceolata</i> L., <i>P. media</i> L. (Plantaginaceae); <i>Sorghum halepense</i> (L.) Pers. (Poaceae)
<i>Chrysolina herbacea</i> (Duftschmid, 1825)	<i>Lamium purpureum</i> L., <i>Mentha aquatica</i> L., <i>M.</i> sp. (Lamiaceae)
<i>Chrysolina polita</i> (Linnaeus, 1758)	<i>Taraxacum officinale</i> Weber ex Wiggers (Asteraceae); <i>Symphytum officinale</i> L. (Boraginaceae); <i>Calamintha nepeta</i> (L.) Savi, <i>Lamium album</i> L., <i>Mentha aquatica</i> L., <i>M.</i> sp. (Lamiaceae)
<i>Chrysolina sturmi</i> (Westhoff, 1882)	<i>Lactuca serriola</i> L. (Asteraceae); <i>Glechoma hederacea</i> L. (Lamiaceae); <i>Galium palustre</i> L. (Rubiaceae)
<i>Chrysomela populi</i> Linnaeus, 1758	<i>Populus alba</i> L., <i>P. nigra</i> L., <i>Salix</i> sp. (Salicaceae)
<i>Chrysomela vigintipunctata</i> Scopoli, 1763	<i>Salix alba</i> L., <i>S. cinerea</i> L., <i>S.</i> sp. (Salicaceae)
<i>Gonioctena fornicata</i> (Brüggemann, 1873)	<i>Medicago sativa</i> L., <i>Medicago</i> × <i>varia</i> Martyn, <i>M.</i> sp., <i>Trifolium hybridum</i> L., <i>T. pratense</i> L. (Fabaceae)
<i>Hydrothassa marginella</i> (Linnaeus, 1758)	<i>Ficaria verna</i> Huds. (Ranunculaceae)
<i>Leptinotarsa decemlineata</i> (Say, 1824)	<i>Lythrum salicaria</i> L. (Lythraceae); <i>Solanum dulcamara</i> L., <i>S. lycopersicum</i> L., <i>S. tuberosum</i> L. (Solanaceae)
<i>Phratora vulgatissima</i> (Linnaeus, 1758)	<i>Populus</i> × <i>canadensis</i> Moench (Salicaceae)
<i>Plagiodera versicolora</i> (Laicharting, 1781)	<i>Salix alba</i> L. (Salicaceae)
Subfamily CLYTRINAE	
<i>Clytra laeviuscula</i> Ratzeburg, 1837	<i>Potentilla reptans</i> L. (Rosaceae); <i>Populus alba</i> L., <i>Salix alba</i> L., <i>S. cinerea</i> L. (Salicaceae)
<i>Labidostomis cyanicornis</i> (Germar, 1822)	<i>Salix alba</i> L., <i>S. cinerea</i> L. (Salicaceae)
<i>Labidostomis humeralis</i> (Schneider, 1792)	<i>Salix alba</i> L. (Salicaceae)
<i>Labidostomis longimana</i> (Linnaeus, 1760)	<i>Salix caprea</i> L. (Salicaceae)
<i>Labidostomis lucida</i> (Germar, 1824)	<i>Agrostis</i> sp., <i>Elymus</i> sp., <i>Poa</i> sp., <i>Setaria</i> sp. (Poaceae); <i>Salix alba</i> L. (Salicaceae)
<i>Smaragdina salicina</i> (Scopoli, 1763)	<i>Achillea millefolium</i> L. (Asteraceae); <i>Prunus spinosa</i> L. (Rosaceae)
Subfamily CRIOCERINAE	
<i>Lema cyanella</i> (Linnaeus, 1758)	<i>Triticum aestivum</i> L. (Poaceae)
<i>Lilioceris lili</i> (Scopoli, 1763)	<i>Alisma plantago-aquatica</i> L. (Alismataceae); <i>Arctium minus</i> (Hill.) Bernh. (Asteraceae); <i>Carex acutiformis</i> Ehrh. (Cyperaceae); <i>Iris pseudacorus</i> L. (Iridaceae); <i>Typha latifolia</i> L. (Poaceae); <i>Salix cinerea</i> L. (Salicaceae)
<i>Oulema gallaeciana</i> (Heyden, 1879)	<i>Deschampsia cespitosa</i> (L.) Beauv., <i>Phragmites</i> sp., <i>Triticum aestivum</i> L. (Poaceae)
<i>Oulema melanopus</i> (Linnaeus, 1758)	<i>Phragmites</i> sp., <i>Triticum aestivum</i> L. (Poaceae)
Subfamily CRYPTOCEPHALINAE	
<i>Cryptocephalus aureolus</i> Suffrian, 1847	<i>Daucus carota</i> L. (Apiaceae); <i>Lapsana communis</i> L., <i>Picris echioides</i> L. (Asteraceae)
<i>Cryptocephalus janthinus</i> Germar, 1824	<i>Conyza canadensis</i> (L.) Cronquist (Asteraceae); <i>Cardaria draba</i> (L.) Desv. (Brassicaceae); <i>Lythrum salicaria</i> L. (Lythraceae)
<i>Cryptocephalus octacosmus</i> Bedel, 1891	<i>Lythrum salicaria</i> L. (Lythraceae)

Table 1. Continued.

Registered species	Plants from which the insects were collected
<i>Cryptocephalus sericeus</i> (Linnaeus, 1758)	<i>Leontodon autumnalis</i> L., <i>Taraxacum officinale</i> Weber ex Wiggers (Asteraceae); <i>Ranunculus repens</i> L. (Ranunculaceae)
<i>Cryptocephalus sexpunctatus</i> (Linnaeus, 1758)	<i>Malus domestica</i> Borkh. (Rosaceae); <i>Salix alba</i> L. (Salicaceae)
Subfamily DONACIINAE	
<i>Donacia crassipes</i> Fabricius, 1775	<i>Nymphaea alba</i> L. (Nymphaeaceae)
<i>Donacia marginata</i> Hoppe, 1795	<i>Nymphaea alba</i> L., <i>Nuphar lutea</i> (L.) Sm. (Nymphaeaceae)
Subfamily EUMOLPINAE	
<i>Pales ulema</i> (Germar, 1813)	<i>Euphorbia cyparissias</i> L. (Euphorbiaceae); <i>Potentilla reptans</i> L., <i>Pyrus communis</i> L. (Rosaceae)
Subfamily GALERUCINAE	
<i>Galeruca tanacetii</i> (Linnaeus, 1758)	<i>Artemisia vulgaris</i> L., <i>Taraxacum officinale</i> Weber ex Wiggers (Asteraceae); <i>Stellaria media</i> (L.) Vill. (Caryophyllaceae)
<i>Galerucella calmariensis</i> (Linnaeus, 1767)	<i>Lythrum salicaria</i> L. (Lythraceae)
<i>Galerucella lineola</i> (Fabricius, 1781)	<i>Lythrum salicaria</i> L. (Lythraceae); <i>Populus nigra</i> L., <i>Salix alba</i> L., <i>S. cinerea</i> L. (Salicaceae)
<i>Galerucella nymphaeae</i> (Linnaeus, 1758)	<i>Nuphar lutea</i> (L.) Sm., <i>Nymphaea alba</i> L. (Nymphaeaceae)
<i>Galerucella pusilla</i> (Duftschmid, 1825)	<i>Lythrum salicaria</i> L. (Lythraceae); <i>Persicaria mitis</i> (Schrank) Assenov (Polygonaceae)
Subfamily HISPINAE	
<i>Hispa atra</i> Linnaeus, 1767	<i>Equisetum arvense</i> L. (Equisetaceae)

spinach, sugar beet, and red beet. Species of the genus *Crepidodera* CHEVROLAT, 1837 most often seen in Obedska Bara are *Crepidodera aurata* (Marsham, 1802), *C. fulvicornis* (Fabricius, 1792) and *C. plutus* (Latreille, 1804). These may occur as facultative pests of poplars and willows (NONVEILLER 1960). It was observed that individuals of these species make a large number of small ascigerous damages to leaves. *Phratora vulgatissima* (Linnaeus, 1758) was collected in plantations of hybrid poplars at the Kupinski Kut site, where it makes minor damages to young leaves. The species is known as a serious pest in forestry because it can cause defoliation of Salicaceae species. *Cassida nobilis* Linnaeus, 1758 is known as a pest of sugar beet. In Obedska Bara this species was collected only from *Silene latifolia* Poiret, but in smaller numbers. *Chrysomela populi* Linnaeus, 1758 and *C. vigintipunctata* Scopoli, 1763 are pests of poplars and willows. During the collecting only local damages to individual trees were observed. *Gonioctena fornicata* (Brüggemann, 1873) is a pest of alfalfa and red clover. It is very often found on the entire area of Obedska Bara on the mentioned crops. *Leptinotarsa decemlineata* (SAY, 1824) is an invasive pest of potatoes. The specimens were collected from potato and tomato plants and some wild

species of the genus *Solanum* L. *Oulema melanopus* (LINNAEUS, 1758) damages leaves and stems of cereals. Everywhere in Obedska Bara this species is very common, and mostly occurs in areas under wheat and corn. *Galeruca tanacetii* (LINNAEUS, 1758) is listed as a plant pest of meadows and pastures, but so far it has not been noticed that this species makes any kind of damage to plants of the family Poaceae. *Galerucella lineola* (FABRICIUS, 1781) can occur as a pest of poplars and willows. It can often be found in the immediate vicinity of Obedska Bara, but significant damages were not observed.

In the first detailed study of the Chrysomelidae encountered in the area of Obedska Bara Special Nature Reserve, the state of insect fauna of the typical wet habitat has been analysed in the area of Northern Serbia (Autonomous Province of Vojvodina). Approximately 18% of the total number of chrysomelid species currently known in the whole of Serbia has been collected. Since Chrysomelidae is almost exclusively phytophagous group, the structure of the species present in Obedska Bara reflects the ecological characteristics of particular genera and species because the insects are associated with the respective host plants. Identified insect species are widespread in Europe and Palaearctic area.

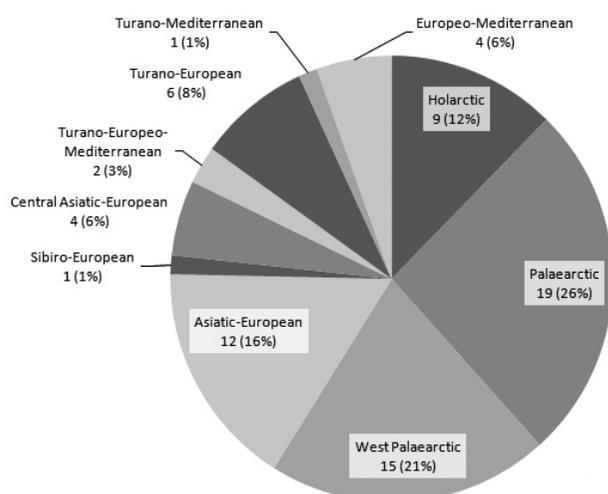


Fig. 3. Affiliation of Chrysomelidae species from the Obedska Bara Special Nature Reserve with some chorotypes of Holarctic.

Among the collected insects, two species stand out as new for the fauna of Serbia: *Longitarsus ferrugineus* (Foudras, 1860) (subfamily Alticinae) and *Hydrothassa marginella* (Linnaeus, 1758) (subfamily Chrysomelinae). In the faunistic study by TRIPKOVIĆ-ČUBRILOVIĆ (1960), which covered different groups of insects in the area of Obedska Bara, 11 chrysomelid species from eight genera and four subfamilies were established. In relation to this study, a far greater number of species and genera were found in the present paper. However, the presence of the species *Liliocercis merdigera* (Linnaeus, 1758) and *Xanthogaleruca luteola* (Müller, 1766) has not been determined, which had previously been ascertained (TRIPKOVIĆ-ČUBRILOVIĆ 1960).

On the basis of zoogeographic division according to VIGNA TAGLIANTI *et al.* (1999), there are 13 different chorotypes in the area of Holarctic and six chorotypes in Europe. The species of Chrysomelidae identified in Obedska Bara are classified into 10 chorotypes of Holarctic and three chorotypes of Europe. Most of the established species are quite widely distributed. The greatest number of the species belong to Palaearctic, West Palaearctic, and European chorotypes (Fig. 3). We identified 19 Palaearctic species (26% of the total number of species), 15 West Palaearctic species (21% of all species), 12 Asiatic-European species (16% of all species), while nine species (12%) belong to Holarctic chorotype. The rest consists mainly of species that inhabit the southern parts of Europe, the Mediterranean area or spread in the east to the cen-

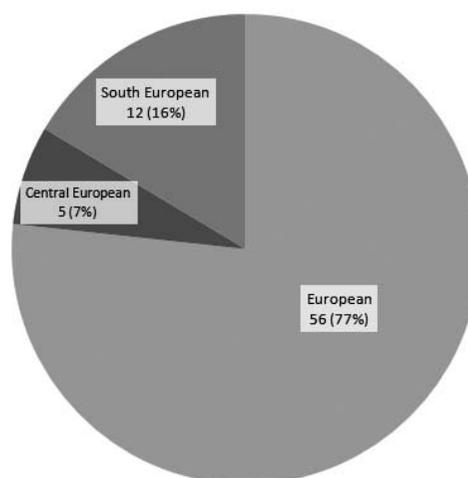


Fig. 4. Affiliation of Chrysomelidae species from the Obedska Bara Special Nature Reserve with some chorotypes of Europe.

tral parts of Asia. Taking into account the European chorotypes, European chorotype, which includes species widely distributed in Europe, includes 56 collected species (77% of the total number of species) (Fig. 4). South European elements of chrysomelid fauna in Obedska Bara are represented to a greater extent (12 species or 16%) as compared to the Central European ones (five species or 7%) (Fig. 4). There were no endemic species or species with narrow ranges of distribution. Typical East European elements of fauna are absent. In the examined area species that are widespread in the southern parts of Europe and those spreading in the east to Caucasus Mts. are increasingly present.

When collecting insects, most of the time is set aside for monitoring the behaviour of many species during the feeding in nature. The identified host plants for the insect species analysed in this paper are in most of the cases those that have already been confirmed by previous authors. In general, identification of nutrition, the presence of adults and larvae, and many of damages to the plant were taken as an indication that the species really fed on the plant. However, in some cases it was difficult to distinguish whether it is a primary or a secondary host plant. For many species feeding on secondary host plants was observed. By choosing different types of habitats through this and other studies a task of determining the diversity of Chrysomelidae fauna as a typical phytophagous group in Serbia was imposed. Although a general cataloguing is done, the fauna of this group in Serbia is still very poorly studied,

(GAVRILOVIĆ, ČURČIĆ 2011). Economically important species are relatively well studied but the biology of the most other species is poorly known. Determining the composition of fauna and trophic relationships between the insects and the host plants as approximate

as possible contributes to better understanding of the whole group in the area of Southeastern Europe.

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