

## THE LONGHORN BEETLES (COLEOPTERA: CERAMBYCIDAE) OF THE CITY OF KRAGUJEVAC (CENTRAL SERBIA)

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**ABSTRACT.** This paper represents the contribution to the knowledge of the longhorn beetle (Coleoptera: Cerambycidae) fauna of the City of Kragujevac (Central Serbia). Based on the material collected from 2010 to 2014 by authors, as well as on available literature data, 66 species and 13 subspecies from five subfamilies were recorded, while the highest number of species is registered within the subfamilies Cerambycinae (26) and Lamiinae (19). Four species are rarely found in Serbia: *Vadonia moesiaca* (Daniel & Daniel, 1891), *Stictoleptura cordigera* (Füsslins, 1775), *S. erythroptera* (Hagenbach, 1822), and *Isotomus speciosus* (Schneider, 1787). Subspecies *Saphanus piceus ganglbaueri* Brancsik, 1886 is Balkan endemic. Six of recorded taxa [*Cerambyx* (*Cerambyx*) *cerdo cerdo* Linnaeus, 1758, *Morimus asper funereus* (Mulsant, 1863), *Agapanthia kirbyi* (Gyllenhal, 1817), *Cortodera flavimana flavimana* (Waltl, 1838), *Vadonia moesiaca* and *Saphanus piceus ganglbaueri*] are protected both nationally and internationally. The largest number of recorded taxa belong to Euro-Mediterranean (26) and Euro-Siberian (21) chorotypes. This suggests that both the habitats and climate in the City of Kragujevac and Central Serbia are increasingly assuming more sub-Mediterranean and subtropical features, primarily due to the negative human impact.

**Keywords:** Cerambycidae, fauna, Kragujevac, chorotypes, Central Serbia.

## INTRODUCTION

The City of Kragujevac is located in the Kragujevac Valley, the central part of the Republic of Serbia (Fig. 1), and it is the fourth largest city in the country. It is determined by the coordinates N 44° 22' and E 20° 56' and covers the area of 835 km<sup>2</sup>, with the altitude of 180 m a.s.l. (STEPANOVIĆ, 1974). The city lies between Mt. Rudnik in the west and northwest, Gledić Mts. in the south, Mt. Crni Vrh in the east and meadows by the Uglješnica River in the north (Fig. 2). The highest peak is Dulenski Crni Vrh (895 m a.s.l.), belonging to the Gledić Mts. The relief of the city is represented by meadows along the city's rivers and streams, hills and mountains (Mt. Rudnik, Gledić Mts. and Mt. Crni Vrh) (STEPANOVIĆ, 1974).

The Neogenic sediments of Middle and Upper Miocene – sandstone, clay and marl – are the major geological substrates in the city. The most common soil types are smonica and smonica in the process of browning (FILIPOVSKI AND ĆIRIĆ, 1963). Hydrographic network is represented by the largest rivers, Lepenica and Uglješnica, and a large number of small rivers



identified seven species in the investigated area. ILIĆ (2005) has reported solely two additional taxa from his own material, from the Grošnica Lake surroundings – *Rhagium (Megarhagium) mordax* (DeGeer, 1775) and *Saphanus piceus ganglbaueri* Brancsik, 1886. The most extensive study of longhorn beetles in the investigated area was given by VUKAJLOVIĆ and ŽIVANOVIĆ (2014), who reported 41 species and eight subspecies in the southern part of the City of Kragujevac – the Gledić Mts. Altogether, 58 species and 13 subspecies were recorded in the city until now.

The aim of this paper was to contribute to the study of longhorn beetle fauna of the City of Kragujevac and the Šumadija Region (Central Serbia), which is one of the least studied areas of the Republic of Serbia in terms of biodiversity. Also, we wanted to give a chorotype analysis, which may give us a more complete overview of the city's fauna, but also the state of the habitats in the city.

## MATERIALS AND METHODS

The results presented in this paper represent data that are partially taken from several previously published works (ADAMOVIĆ, 1965; TREBJEŠANIN, 1990; ĐORĐEVIĆ, 2002; ILIĆ, 2005; VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Also, the new original data are given.

The adult longhorn beetles were collected from June 2010 to August 2014 at different localities of the City of Kragujevac (Fig. 2): Šumarice Memorial Park, Šumarice Lake surroundings, Košutnjak Forest, Uglješnica River surroundings, Grošnica Reservoir surroundings, and the villages of Petrovac, Stragari and Opornica. One longhorn beetle specimen was collected in the Šumarice Memorial Park in June 1997 by Nataša Nešić (Kragujevac, Serbia). The beetles were collected in different habitats, mainly meadows, from ruderal vegetation, but also in oak and beech forests.

Different collecting techniques were used: pitfall trapping, hanging wine traps on branches of trees, sweeping vegetation with entomological net, hand collecting, etc.

We identified the sex of the each specimen and then labeled all the specimens. For identification of the specimens, we used different keys (MIKŠIĆ and GEORGIJEVIĆ, 1971, 1973; MIKŠIĆ and KORPIĆ, 1985; BENSE, 1995). Taxonomic classification was performed as in DANILEVSKY (2015). For chorotype classification, we used the system proposed by ILIĆ (2005). The material is kept in the first author's collection at the Faculty of Science in Kragujevac.

## RESULTS AND DISCUSSION

Based on our current research, as well as on the previous literature data (ADAMOVIĆ, 1965; TREBJEŠANIN, 1990; ĐORĐEVIĆ, 2002; ILIĆ, 2005; VUKAJLOVIĆ and ŽIVANOVIĆ, 2014), we have identified 66 species and 13 subspecies (Tab. 1) classified into 40 genera, 21 tribes and five subfamilies in the City of Kragujevac. This number represents 25.57% of the species of longhorn beetles registered to date in Serbia (262) (ILIĆ and ĆURČIĆ, 2013; ILIĆ *et al.*, 2013; STANČIĆ, 2013; VUKAJLOVIĆ and ŽIVANOVIĆ, 2014), which makes it around one quarter of all registered species in the country.

In this particular research, which lasted from June 2010 to August 2014, a total of 199 adult longhorn beetle specimens were collected in the City of Kragujevac. The part of the results has already been published somewhat earlier (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014), where 41 species were identified.

The new data include 32 species. We are presenting a list of longhorn beetles of the City of Kragujevac, containing both our data and previous literature sources, including the findings and the chorotype identification.

Family Cerambycidae

Subfam Prioninae

Tribe Prionini

1. *Prionus coriarius* (Linnaeus, 1758), Kragujevac (TREBJEŠANIN, 1990); village of Dulene (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.

Tribe Aegosomatini

2. *Aegosoma (Aegosoma) scabricornis* (Scopoli, 1763), Kragujevac (ADAMOVIĆ, 1965). Chorotype: Euro-Mediterranean.

Subfamily Lepturinae

Tribe Rhagiini

3. *Rhagium (Rhagium) inquisitor* (Linnaeus, 1758), Grošnica Reservoir surroundings, 01 June 2014, 1 ♀, leg. N. Živanović. Chorotype: Euro-Mediterranean.
4. *Rhagium (Megarhagium) mordax* (DeGeer, 1775), Grošnica Reservoir surroundings (ILIĆ, 2005). Chorotype: Euro-Siberian.
5. *Rhagium (Megarhagium) sycophanta* (Schrank, 1781), Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.
6. *Dinoptera collaris* (Linnaeus, 1758), village of Donja Sabanta (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.
7. *Cortodera flavimana flavimana* (Waltl, 1838), Šumarice Memorial Park, 15 May 2013, 1 ♂, leg. F. Vukajlović. Chorotype: Pontic.
8. *Pidonia (Pidonia) lurida* (Fabricius, 1792), village of Donja Sabanta (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Central-South European.

Tribe Lepturini

9. *Vadonia unipunctata unipunctata* (Fabricius, 1787), Kragujevac (ĐORĐEVIĆ, 2002); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Pontic.
10. *Vadonia moesiaca* (Daniel & Daniel, 1891), Šumarice Memorial Park, 28 May 2014, 1 ♂, leg. N. Živanović; *idem*, 15 August 2014, 1 ♀, leg. F. Vukajlović. Rare species in Serbia. Recorded in central, eastern and southern regions of the country (ADAMOVIĆ, 1965; ILIĆ, 2005; GNJATOVIĆ and ŽIKIĆ, 2011). Chorotype: Turano-Mediterranean.
11. *Pseudovadonia livida* (Fabricius, 1776), Kragujevac (ADAMOVIĆ, 1965). Chorotype: Euro-Mediterranean.
12. *Stictoleptura (Stictoleptura) cordigera* (Füsslins, 1775), Kragujevac (TREBJEŠANIN, 1990; ĐORĐEVIĆ, 2002); village of Dulene; Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Rarely found in Serbia. Previously recorded in Central (JANKOVIĆ, 1972), South (ADAMOVIĆ, 1965; ILIĆ, 2005; JAKŠIĆ *et al.*, 2006), and North Serbia (PIL and STOJANOVIĆ, 2008). Chorotype: Euro-Mediterranean.
13. *Stictoleptura (Stictoleptura) erythroptera* (Hagenbach, 1822), Kragujevac (TREBJEŠANIN, 1990); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Rarely found in the country. Reported for Western, Central and Eastern Serbia (ILIĆ, 2005; ČKRKIĆ, 2012; ILIĆ AND ĆURČIĆ, 2013; ILIĆ *et al.*, 2013). Chorotype: Central-South European.

14. *Anastrangalia sanguinolenta* (Linnaeus, 1760), Šumarice Memorial Park, 14 May 2012, 1 ♀, leg. F. Vukajlović; *idem*, 18 June 2012, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Siberian.
15. *Pachytodes cerambyciformis* (Schrank, 1781), Šumarice Memorial Park, 31 May 2012, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Siberian.
16. *Pachytodes erraticus* (Dalman, 1817), Kragujevac (TREBJEŠANIN, 1990); villages of Donja Sabanta, Baljkovac and Dulene (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 26 May 2012, 1 ♀, leg. F. Vukajlović; *idem*, 28 July 2013, 1 ♀, leg. F. Vukajlović; *idem*, 15 May 2014, 1 ♂, leg. N. Živanović; *idem*, 20 May 2014, 1 ♂, leg. N. Živanović; *idem*, 30 July 2014, 1 ♀, leg. F. Vukajlović; village of Opornica, 15 June 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Mediterranean.
17. *Rutpela maculata* (Poda, 1761), Kragujevac (TREBJEŠANIN, 1990); villages of Donja Sabanta, Baljkovac and Dulene; Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Mediterranean.
18. *Stenurella* (*Stenurella*) *melanura* (Linnaeus, 1758), village of Baljkovac (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.
19. *Stenurella* (*Priscostenurella*) *bifasciata* (Müller, 1776), Šumarice Memorial Park, 15 May 2013, 1 ♂, leg. N. Živanović. Chorotype: Euro-Siberian.
20. *Stenurella* (*Priscostenurella*) *septempunctata septempunctata* (Fabricius, 1792), Kragujevac (ADAMOVIĆ, 1965); village of Donja Sabanta (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Mediterranean.
21. *Stenurella* (*Nigrostenurella*) *nigra* (Linnaeus, 1758), village of Donja Sabanta (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 15 May 2013, 1 ♂, leg. N. Živanović. Chorotype: Euro-Mediterranean.

## Subfamily Spondylidinae

## Tribe Asemini

22. *Saphanus piceus ganglbaueri* Brancsik, 1886, Grošnica Reservoir surroundings (ILIĆ, 2005). Chorotype: Balkan.
23. *Tetropium castaneum* (Linnaeus, 1758), Šumarice Memorial Park, 13 May 2014, 1 ♂, leg. N. Živanović. Chorotype: Euro-Siberian.

## Subfamily Cerambycinae

## Tribe Hesperophanini

24. *Stromatium auratum* (Böber, 1793), Kragujevac (TREBJEŠANIN, 1990); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 13 June 2013, 1 ♀, leg. F. Vukajlović; *idem*, 30 July 2014, 1 ♀, leg. F. Vukajlović; *idem*, 02 August 2014, 2 ♂, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Mediterranean.

## Tribe Graciliini

25. *Penichroa fasciata* (Stephens, 1831), Kragujevac (ADAMOVIĆ, 1965). Chorotype: Euro-Mediterranean.

## Tribe Stenopterini

26. *Stenopterus flavicornis* Küster, 1846, Kragujevac (ADAMOVIĆ, 1965); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Mediterranean.
27. *Stenopterus rufus geniculatus* Kraatz, 1863, Kragujevac (ADAMOVIĆ, 1965); Šumarice Memorial Park, 29 April 2012, 1 ♂, leg. F. Vukajlović; *idem*, 15 May 2013, 1 ♀, leg. N. Živanović; Šumarice Lake surroundings, 05 June 2014, 1 ♂, leg. F. Vukajlović. Chorotype: Euro-Mediterranean.

## Tribe Molorchini

28. *Molorchus (Glaphyra) umbellatarum* (Schreber, 1759), Kragujevac (TREBJEŠANIN, 1990); village of Dulene (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Mediterranean.

## Tribe Cerambycini

29. *Cerambyx (Cerambyx) cerdo cerdo* Linnaeus, 1758, Kragujevac (TREBJEŠANIN, 1990); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Palaearctic.
30. *Cerambyx (Cerambyx) miles* Bonelli, 1812, Kragujevac (ADAMOVIĆ, 1965). Chorotype: Euro-Mediterranean.
31. *Cerambyx (Microcerambyx) scopolii* Füsslins, 1775, Grošnica Reservoir surroundings; village of Baljkovac (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 03 June 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Mediterranean.

## Tribe Purpuricenini

32. *Purpuricenus kaehleri* (Linnaeus, 1758), Kragujevac (ADAMOVIĆ, 1965; ĐORĐEVIĆ, 2002); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Central-South European.
33. *Purpuricenus budensis* (Goeze, 1783), Kragujevac (ADAMOVIĆ, 1965; ĐORĐEVIĆ, 2002); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Pontic.

## Tribe Rosaliini

34. *Rosalia alpina* (Linnaeus, 1758), Kragujevac (ADAMOVIĆ, 1965). Chorotype: Euro-Mediterranean (montane).

## Tribe Callidiini

35. *Pyrrhidium sanguineum* (Linnaeus, 1758), Kragujevac (ADAMOVIĆ, 1965). Chorotype: Euro-Mediterranean.
36. *Phymatodes (Phymatodes) testaceus* (Linnaeus, 1758), Kragujevac (ADAMOVIĆ, 1965; TREBJEŠANIN, 1990; ĐORĐEVIĆ, 2002); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 07 July 2013, 1 ♀, leg. F. Vukajlović; *idem*, 28 July 2013, 1 ♀, leg. F. Vukajlović; *idem*, 24 April 2014, 1 ♂, 1 ♀, leg. N. Živanović; *idem*, 25 May 2014, 1 ♂, leg. N. Živanović; *idem*, 12 June 2014, 1 ♀, leg. F. Vukajlović; *idem*, 15 August 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Palaearctic.

## Tribe Anaglyptini

37. *Anaglyptus mysticus* (Linnaeus, 1758), village of Dulene (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); village of Opornica, 16 May 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Central-South European.

## Tribe Clytini

38. *Plagionotus arcuatus* (Linnaeus, 1758), Kragujevac (ADAMOVIĆ, 1965); Uglješnica River surroundings, 14 April 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Mediterranean.
39. *Plagionotus detritus* (Linnaeus, 1758), Kragujevac (ĐORĐEVIĆ, 2002); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Mediterranean.
40. *Echinocerus floralis* (Pallas, 1773), Kragujevac (ADAMOVIĆ, 1965); Šumarice Memorial Park, 15 May 2014, 1 ♂, 1 ♀, leg. F. Vukajlović; *idem*, 10 June 2014, 1 ♀, leg. N. Živa-

- nović; Grošnica Reservoir surroundings, 15 June 2014, 1 ♂, leg. F. Vukajlović. Chorotype: Euro-Siberian.
41. *Isotomus speciosus* (Schneider, 1787), Kragujevac (ADAMOVIĆ, 1965); Šumarice Memorial Park, 12 June 1997, 1 ♀, leg. N. Nešić. Rare species in Serbia (ILIĆ, 2005). Not recorded in North Serbia. Chorotype: Pontic.
  42. *Chlorophorus (Immaculatus) varius* (Müller, 1766), Kragujevac (ADAMOVIĆ, 1965; TREBJEŠANIN, 1965); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.
  43. *Chlorophorus (Humeromaculatus) figuratus* (Scopoli, 1763), Kragujevac (ADAMOVIĆ, 1965; ĐORĐEVIĆ, 2002); Šumarice Memorial Park, 10 July 2010, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Siberian.
  44. *Chlorophorus (Perderomaculatus) sartor* (Müller, 1766), Kragujevac (TREBJEŠANIN, 1990); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.
  45. *Xylotrechus (Xylotrechus) arvicola* (Olivier, 1795), Šumarice Memorial Park, 15 August 2014, 1 ♂, leg. F. Vukajlović. Chorotype: Euro-Mediterranean.
  46. *Xylotrechus (Rusticoclytus) rusticus* (Linnaeus, 1758), Šumarice Memorial Park, 15 May 2012, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Siberian.
  47. *Clytus (Clytus) arietis* (Linnaeus, 1758), village of Baljkovac (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 15 May 2014, 1 ♀, leg. N. Živanović. Chorotype: Euro-Siberian.
  48. *Clytus (Clytus) rhamni rhamni* Germar, 1817, Kragujevac (ADAMOVIĆ, 1965; TREBJEŠANIN, 1990); Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 10 July 2013, 1 ♂, leg. F. Vukajlović. Chorotype: Central-South European.
  49. *Clytus (Clytus) rhamni temesiensis* Germar, 1824, Kragujevac (ADAMOVIĆ, 1965). DANILEVSKY (2015) didn't report it for Serbia. Chorotype: Pontic.
  50. *Neoclytus acuminatus* (Fabricius, 1775), Šumarice Memorial Park, 02 August 2014, 1 ♂, leg. F. Vukajlović. Chorotype: Holarctic.

#### Subfamily Lamiinae

##### Tribe Mesosini

51. *Mesosa (Aplocnemia) nebulosa* (Fabricius, 1781), village of Baljkovac (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 07 June 2014, 1 ♂, leg. F. Vukajlović. Chorotype: Euro-Mediterranean.

##### Tribe Lamiini

52. *Morimus asper funereus* (Mulsant, 1863), Kragujevac (ADAMOVIĆ, 1965; TREBJEŠANIN, 1990); Grošnica Reservoir surroundings; village of Dulene (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Central-South European.

##### Tribe Dorcadionini

53. *Dorcadion (Carinatodorcadion) fulvum erythropterum* Fischer-Waldheim, 1823, village of Donja Sabanta (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 16 May 2013, 1 ♀, leg. F. Vukajlović; *idem*, 10 June 2013, 1 ♂, leg. N. Živanović; *idem*, 25 April 2014, 1 ♀, leg. F. Vukajlović; *idem*, 18 May 2014, 1 ♂, 1 ♀, leg. N. Živanović; *idem*, 06 June 2014, 1 ♀, leg. N. Živanović; *idem*, 10 June 2014, 1 ♀, leg. N. Živanović; *idem*, 16 July 2014, 1 ♂, leg. F. Vukajlović; *idem*, 13 August 2014, 1 ♂, leg. F. Vukajlović; village of Petrovac, 01 May 2013, 1 ♀, leg. F. Vukajlović; *idem*, 07 June 2014, 1 ♂, leg. F. Vukajlović; village of Opornica, 15 June 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Pontic.

54. *Dorcadion (Carinatodorcadion) aethiops aethiops (Scopoli, 1763)*, village of Baljkovac; Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 22 June 2010, 1 ♂, leg. F. Vukajlović; *idem*, 18 July 2013, 1 ♀, leg. N. Živanović; *idem*, 28 July 2013, 1 ♂, 1 ♀, leg. N. Živanović; *idem*, 24 April 2014, 1 ♂, leg. F. Vukajlović; *idem*, 18 May 2014, 1 ♂, leg. N. Živanović; *idem*, 07 June 2014, 1 ♂, leg. F. Vukajlović; *idem*, 15 June 2014, 1 ♀, leg. F. Vukajlović; Grošnica Reservoir surroundings, 17 May 2014, 1 ♂, 1 ♀, leg. F. Vukajlović; Šumarice Lake surroundings, 05 June 2014, 1 ♂, leg. F. Vukajlović. Chorotype: Euro-Mediterranean.
55. *Dorcadion (Cribridorcadion) pedestre pedestre (Poda, 1761)*, villages of Donja Sabanta and Baljkovac (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 19 July 2010, 1 ♂, leg. F. Vukajlović; *idem*, 16 August 2011, 1 ♂, leg. F. Vukajlović; *idem*, 19 May 2012, 1 ♀, leg. F. Vukajlović; Košutnjak Forest, 10 June 2012, 1 ♂, leg. F. Vukajlović; *idem*, 14 June 2014, 1 ♂, leg. F. Vukajlović; village of Petrovac, 01 May 2013, 1 ♂, leg. F. Vukajlović; *idem*, 18 April 2014, 1 ♀, leg. F. Vukajlović; Grošnica Reservoir surroundings, 17 May 2014, 1 ♀, leg. F. Vukajlović; *idem*, 28 May 2014, 1 ♂, leg. N. Živanović. Chorotype: Pontic.
56. *Dorcadion (Pedestredorcadion) scopolii (Herbst, 1784)*, Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Pontic.
57. *Neodorcadion bilineatum (Germar, 1824)*, Kragujevac (TREBJEŠANIN, 1990); villages of Donja Sabanta and Baljkovac; Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 11 July 2010, 1 ♂, leg. F. Vukajlović; *idem*, 18 June 2012, 1 ♂, leg. F. Vukajlović; *idem*, 10 May 2013, 1 ♂, 1 ♀, leg. F. Vukajlović; *idem*, 20 July 2013, 1 ♀, leg. F. Vukajlović; *idem*, 15 May 2014, 2 ♂, 2 ♀, leg. N. Živanović; *idem*, 25 May 2014, 1 ♂, leg. N. Živanović; *idem*, 15 August 2014, 2 ♂, 2 ♀, leg. F. Vukajlović; village of Petrovac, 01 May 2013, 1 ♂, leg. F. Vukajlović; *idem*, 03 June 2013, 1 ♂, leg. F. Vukajlović; village of Stragari, 21 May 2013, 1 ♂, leg. F. Vukajlović; Uglješnica River surroundings, 14 April 2014, 1 ♀, leg. F. Vukajlović; village of Opornica, 15 June 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Pontic.

#### Tribe Phytoeciini

58. *Oberea oculata (Linnaeus, 1758)*, Kragujevac (ADAMOVIĆ, 1965). Chorotype: Euro-Siberian.
59. *Phytoecia (Musaria) affinis affinis (Harrer, 1784)*, village of Donja Sabanta (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.
60. *Phytoecia (Phytoecia) icterica (Schaller, 1783)*, Kragujevac (TREBJEŠANIN, 1990); village of Dulene (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.
61. *Phytoecia (Phytoecia) pustulata (Schrank, 1776)*, Kragujevac (ADAMOVIĆ, 1965; TREBJEŠANIN, 1990); village of Dulene (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Siberian.

#### Tribe Agapanthiini

62. *Calamobius filum (Rossi, 1790)*, village of Donja Sabanta (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Mediterranean.
63. *Agapanthia (Synthapsia) kirbyi (Gyllenhal, 1817)*, village of Donja Sabanta (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014). Chorotype: Euro-Mediterranean.
64. *Agapanthia (Epoptes) dahli (Richter, 1821)*, Kragujevac (ADAMOVIĆ, 1965); Grošnica Reservoir surroundings, 15 May 2014, 1 ♂, leg. N. Živanović; village of Opornica, 16 May 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Siberian.
65. *Agapanthia (Epoptes) villosoviridescens (DeGeer, 1775)*, Kragujevac (ADAMOVIĆ, 1965; TREBJEŠANIN, 1990); villages of Donja Sabanta and Dulene; Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 09 May 2012, 1



♀, leg. F. Vukajlović; *idem*, 15 May 2014, 1 ♀, leg. F. Vukajlović; village of Petrovac, 19 April 2014, 1 ♀, leg. F. Vukajlović. Chorotype: Euro-Siberian.

**66. *Agapanthia (Agapanthia) cardui* (Linnaeus, 1767)**, Šumarice Memorial Park, 10 June 2014, 1 ♂, leg. N. Živanović. Chorotype: Euro-Mediterranean.

**67. *Agapanthia (Smaragdula) violacea* (Fabricius, 1775)**, Kragujevac (ADAMOVIĆ, 1965); village of Donja Sabanta; Grošnica Reservoir surroundings (VUKAJLOVIĆ and ŽIVANOVIĆ, 2014); Šumarice Memorial Park, 25 May 2014, 1 ♀, leg. N. Živanović. Chorotype: Euro-Mediterranean.

The largest number of longhorn beetle species in the City of Kragujevac is registered within the subfamily Cerambycinae (26 species), followed by Lepturinae (19 species) and Lamiinae (17 species) (Table 1). The tribes Lepturini (13 species) and Clytini (12 species) are the most numerous in species. The highest number of species among the analyzed genera have *Agapanthia* Audinet-Serville, 1835 (five species), *Dorcadion* Dalman in Schönherr, 1817 and *Stenurella* Villiers, 1974 (with four species each).

Table 1. Total number of longhorn beetle taxa in the City of Kragujevac and numbers of the taxa within subfamilies.

Subfamily	Number of tribes	Number of genera	Number of species	Number of subspecies
Prioninae	2	2	2	0
Lepturinae	2	11	19	3
Spondylidinae	2	2	2	1
Cerambycinae	10	17	26	4
Lamiinae	5	8	17	5
<b>Totally</b>	<b>21</b>	<b>40</b>	<b>66</b>	<b>13</b>

Four of recorded species are rarely found in Serbia so far: *Vadonia moesiaca* (Fig. 3), *Stictoleptura cordigera* (Füsslin, 1775) (Fig. 4), *S. erythroptera* (Hagenbach, 1822) (Fig. 5), and *Isotomus speciosus* (Fig. 6). As far as endemics are concerned, *Saphanus piceus ganglbaueri* is a Balkan endemic subspecies which has been recorded in the investigated area (ILIĆ, 2005).

Six recorded taxa [*Cerambyx (Cerambyx) cerdo cerdo* Linnaeus, 1758, *Morimus asper funereus* (Mulsant, 1863), *Agapanthia kirbyi* (Gyllenhal, 1817) (Fig. 7), *Cortodera flavimana flavimana* (Fig. 8), *Vadonia moesiaca* and *Saphanus piceus ganglbaueri*] are protected both nationally (ANONYMOUS, 2010) and internationally (EU, 1992; IUCN, 2014).

The chorotype analysis showed that 26 taxa belong to Euro-Mediterranean, 21 to Euro-Siberian, nine to Pontic, six to Central-South European, two to Palearctic, one to Holarctic and one to Turano-Mediterranean chorotypes, while one is being endemic of the Balkan Peninsula (*Saphanus piceus ganglbaueri*). The ten taxa are common to steppe habitats: *Vadonia unipunctata unipunctata* (Fabricius, 1787), *Chlorophorus (Immaculatus) varius* (Müller, 1766), *Phytoecia (Phytoecia) pustulata* (Schrank, 1776), *Dorcadion (Carinatodorcadion) fulvum erythropterum*, *D. (C.) aethiops aethiops*, *D. (Cribridorcadion) pedestre pedestre*, *D. (C.) scopolii* (Herbst, 1784), *Neodorcadion bilineatum*, *Agapanthia (Epopetes) dahli*, and *A. (Agapanthia) cardui* (ILIĆ, 2005; PIL and STOJANOVIĆ, 2008). *Rosalia alpina* (Linnaeus, 1758), *Rhagium inquisitor*, *Tetropium castaneum* (Linnaeus, 1758), and *Pidonia lurida* (Fabricius, 1792) are typical for mountain habitats (ILIĆ, 2005; PIL and STOJANOVIĆ, 2008).

The chorotype analysis can give us interesting data about the conditions of the habitats in the City of Kragujevac. The largest number of recorded species lives in Europe, especially

in the Mediterranean. The City of Kragujevac and the whole Šumadija region have humid continental climate (STEPANOVIĆ, 1974). But, new data show that the City of Kragujevac and the whole Central Serbia now belong to humid subtropical climate (PEEL *et al.*, 2007). Negative human impact, especially deforestation, causes the territory of the City of Kragujevac and the whole Šumadija region to assume more sub-Mediterranean, subtropical and steppe features, which can also be confirmed by ecological analyzing of the recorded longhorn beetles fauna.



Figure 3. *Vadonia moesiaca* (Daniel & Daniel, 1891)  
(photo: Milan Đurić)



Figure 4. *Stictoleptura cordigera* (Füsslins, 1775)  
(photo: Milan Đurić)



Figure 5. *Stictoleptura erythroptera*  
(Hagenbach, 1822) (photo: Milan Đurić)



Figure 6. *Isotomus speciosus* (Schneider, 1787)  
(photo: Milan Đurić)



Figure 7. *Agapanthia kirbyi* (Gyllenhal, 1817)  
(photo: Milan Đurić)



Figure 8. *Cortodera flavimana flavimana*  
(Waltl, 1838) (photo: Milan Đurić)

## CONCLUSIONS

Based on our research, as well as on the previous literature data (ADAMOVIĆ, 1965; TREBJEŠANIN, 1990; ĐORĐEVIĆ, 2002; ILIĆ, 2005; VUKAJLOVIĆ and ŽIVANOVIĆ, 2014), a total of 66 species and 13 subspecies of longhorn beetles from 40 genera, 21 tribes, and five subfamilies were recorded in the City of Kragujevac, which makes it approximately one quarter of all registered species in the Republic of Serbia.

The recorded longhorn beetles belong to a huge number of different chorotypes, what also gives us the overview of the changes of the habitats and climate in the City of Kragujevac and Central Serbia, from continental to sub-Mediterranean and subtropical.

The knowledge on the longhorn beetle fauna in the City of Kragujevac is far from being complete. The future researches are necessary to be performed in order to improve the current data on this faunistic group in the City of Kragujevac.

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- [1] Figure 1. is based on: <http://www.autoportal.rs/news/Image/geografaska-karta-srbije.jpg>