

NEW RECORDS OF THE GENUS *CALLICERA* PANZER, 1806 (DIPTERA: SYRPHIDAE) FROM SERBIA

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Abstract

Only one species of the genus *Callicera* Panzer, 1806, *Callicera aenea* (Fabricius, 1777), has been recorded in Serbia so far. In addition to the recurring detection of this species, the first records of *Callicera aurata* (Rossi, 1790) and *Callicera spinolae* Rondani, 1844 are documented. Based on the collected and studied material, the distribution maps and identification key for Serbian species are provided.

KEY WORDS: *Callicera aurata*, *Callicera spinolae*, distribution, Serbia, identification key.

Introduction

With about 6000 described species, hoverflies (Diptera: Syrphidae) represent one of the most species-rich dipteran families. About 1800 species were recorded in the Palaearctic region (Van Veen, 2004). Hoverflies are significant pollinators of many plant species, and 19% of all insect pollinators are from the family Syrphidae (Rotheray & Gilbert, 2011).

The genus *Callicera* Panzer, 1809 belongs to the subfamily Eristalinae, tribe Callicerini (Thompson & Rotheray, 1998). *Callicera* comprise robust bee-mimicking species, with very long antennae with arista posted at the apex of the third antennal segment.

The distribution of *Callicera* species is limited to the Holarctic and Indomalayan regions. Most Palaearctic *Callicera* species inhabit southern (mainly Italy) and central Europe (Zimina, 1987). Zimina (1987) has revised the Palearctic species of this genus and recorded 10 species.

In the revision of the European species of this genus, Speight (1991) recognized six species: *Callicera aenea* (Fabricius, 1777), *Callicera aurata* (Rossi, 1790), *Callicera fagesii* (Guerin-Ménéville, 1844), *Callicera macquartii* Rondani, 1844, *Callicera rufa* Schummel, 1842 and *Callicera spinolae* Rondani, 1944.

Smit (2014) described two new species of this genus, *Callicera exigua* from Altay Mountains (Russia) and *C. scintilla* from Jordan. So far, only one species from the genus, *Callicera aenea*, has been recorded in Serbia (Nedeljković *et al.*, 2009).

Larvae of species from the genus *Callicera* are saproxylic and their development is connected to ancient Fagus/Quercus forests (Speight, 2014). *Callicera* adults prefer the same habitats, as well as Pinus forests with over-mature trees (Speight, 2014). Species are typically arboreal, but descend occasionally to drink water and feed (Speight, 2014).

The aim of this study was to complete the faunistic knowledge of the genus *Callicera* in Serbia by examining newly collected specimens deposited in the collection of Department of Biology and Ecology of University of Novi Sad (FSUNS).

Material and Methods

The examined material comprises adult specimens collected by sweeping net in the period 2009-2015. The material is deposited in the entomological collection of the Department of Biology and Ecology, University of Novi Sad, Serbia (FSUNS).

Identification was based on morphological characters of adults according to the key of Speight (1991). The identification key and distribution maps for Serbian species are provided. Maps were obtained using DivaGis software, version 7.5 (Hijmans *et al.*, 2012a, b).

Results

The study of the collected material resulted in the identification of three *Callicera* species in Serbia – *C. aenea*, *C. aurata* and *C. spinolae*, with the findings of the last two species representing the first records for Serbia.

All *Callicera* species recorded in Serbia share the following morphological characters: antennal segment 3 about as long as segments 1+2 together; antennal segment 2 not less than 3/4 the length of antennal segment 1 (Fig. 1a, b).

Recorded species

Callicera aenea (Fabricius, 1777)

Published data: Serbia: Fruška Gora Mountain (Nedeljković *et al.*, 2009)

New data: Serbia: Fruška Gora, Popovica, 45.134663 N 19.805768 E (Fig. 2a), 25.04.2015, 1♂, leg. Z. Nedeljković.

Habitat: Mixed forest of *Carpinus*, *Fagus*, *Fraxinus*, *Quercus* and *Tilia*. The specimen was flying about 2 m above the ground in a grassy clearing.

Distribution: So far, the species was reported from Norway, Sweden, Poland, Czech Republic, France and different parts of Germany through central Europe into the Jura Mountains, the Alps (Switzerland, Austria) and Serbia (Speight, 2014). Zimina (1987) also reported its occurrence from European parts of Russia, south to the Crimea and east into Siberia and on to the Pacific (Sakhalin).

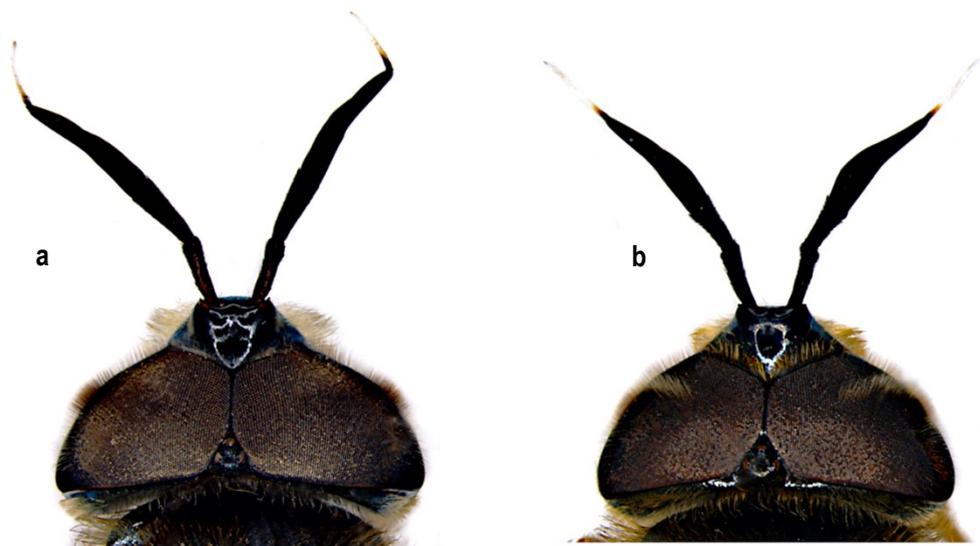


Figure 1. a) Head of *Callicera aenea* (Fabricius, 1777); b) Head of *Callicera spinolae* Rondani, 1844.

Callicera aurata (Rossi, 1790)

New data: Serbia: Mt. Kopaonik, Kadijevac, 43.28567 N 20.82385 E (Fig. 2b), 23.08.2012, 1♀, leg. S. Radenković.

Habitat: Mixed coniferous forest (*Picea*, *Abies*).

Distribution: Provisional, due to confusion with *C. aenea*. It was reported from Norway and Sweden in the north, Britain, to the Mediterranean and southern Europe including France, central Spain, Italy, the former Yugoslavia, Greece and Turkey, throughout central Europe with records from Germany and Switzerland. As *C. zhelochovtsevi* Zimina, 1982, it was also reported from Albania and southern parts of European Russia, including the Crimea and Caucasus and on to Azerbaijan (Speight, 2014).

Callicera spinolae Rondani, 1944

New data: Đerdap (Iron Gate gorge), Ciganski potok, 44.54104 N 22.02024 E (Fig. 2c), 14.09.2012, 4♂, leg. A. Vujić; Pčinja, Trgovište, 42.38264 N 22.0501 E, 07.09.2012, 1♀, leg. A. Vujić.

Habitat: Rocky clearings and meadows in the mixed deciduous (*Carpinus* and *Quercus*) forest beside the river.

Distribution: Britain and northern France south to the Pyrenees, central Spain and the Mediterranean; Germany; Italy; Romania; Serbia; Tajikistan (Speight, 2014).



Figure 2. Distribution of *Callicera* species recorded in Serbia: a) *C. aenea* – Mt. Fruška Gora, locality: Popovica; b) *C. aurata* – Mt. Kopaonik, locality Kadijevac; c) *Callicera spinolae* – Đerdap (Iron Gate gorge), locality Ciganski potok, and Pčinja region, locality Trgovište.

Key to the *Callicera* species of Serbia (following Speight, 1991)

1. Tergite 3 with complete, dull black transverse band close to its posterior margin (Fig. 3b). Frons in male with long hairs along eye margin (Fig. 1b). Femora in female entirely yellow-orange *C. spinolae* Rondani
- Tergite 3 shiny all over or with a pair of matt black marks (Fig. 3a). Frons in male without hairs along eye margin (Fig. 1a). Femora in female extensively black 2
2. Mesoscutum thinly but distinctly dusted grayish over almost entire surface, back to scutellum (with or without 2 or 4 distinct longitudinal dusted stripes within the general dusting); pleura entirely pale-haired; hairs on scutellum 2/3 or more than the length of the scutellum (Fig. 4a); all tarsomeres as yellow as the basitarsi, or tarsomeres 3-5 vaguely greyish, much paler than the blackened basal parts of the femora (Fig. 5b) *C. aenea* (Fabricius)
- Mesoscutum brightly shining, except for 2 longitudinal dusted stripes that do not reach the scutellum; pleura usually black-haired ventrally; hairs on scutellum shorter (on scutellar disc, no more than 1/2 of the length of scutellum) (Fig. 4b); tarsomeres 3-5 almost black, as dark as the blackened basal parts of the femora (Fig. 5a) *C. aurata* (Rossi)

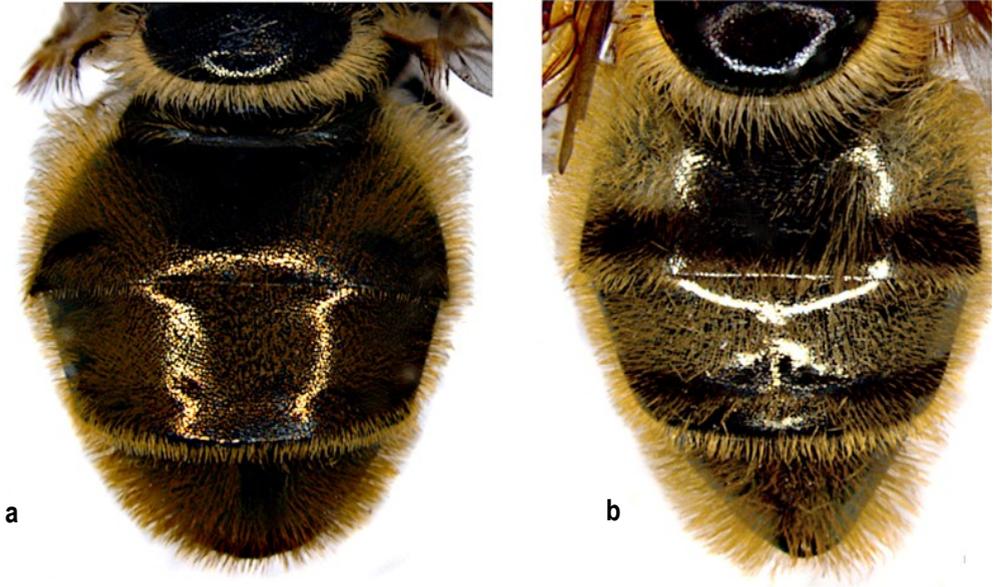


Figure 3. a) Abdomen of *Callicera aurata* (Fabricius, 1777); b) Abdomen of *Callicera spinolae* Rondani, 1844.

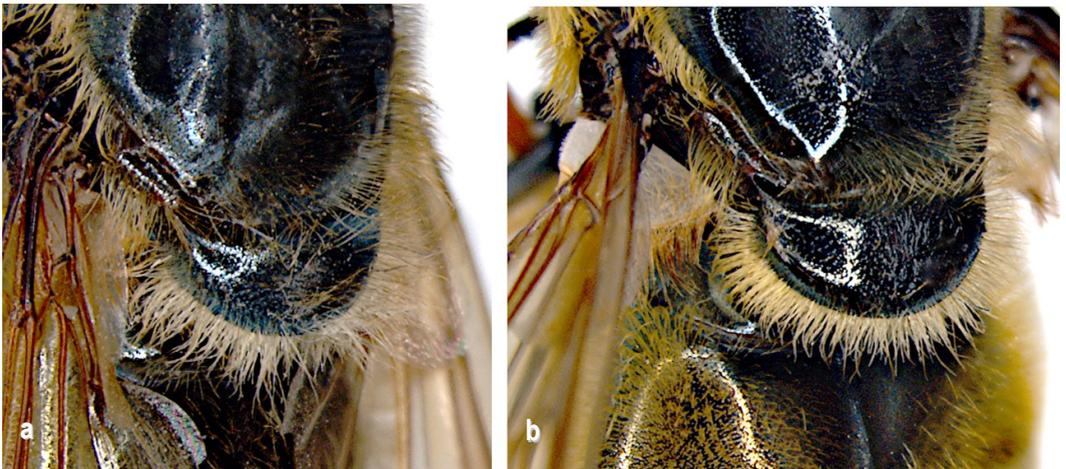


Figure 4. a) Scutellum of *Callicera aenea* (Fabricius, 1777); b) Scutellum of *Callicera aurata* (Fabricius, 1777).

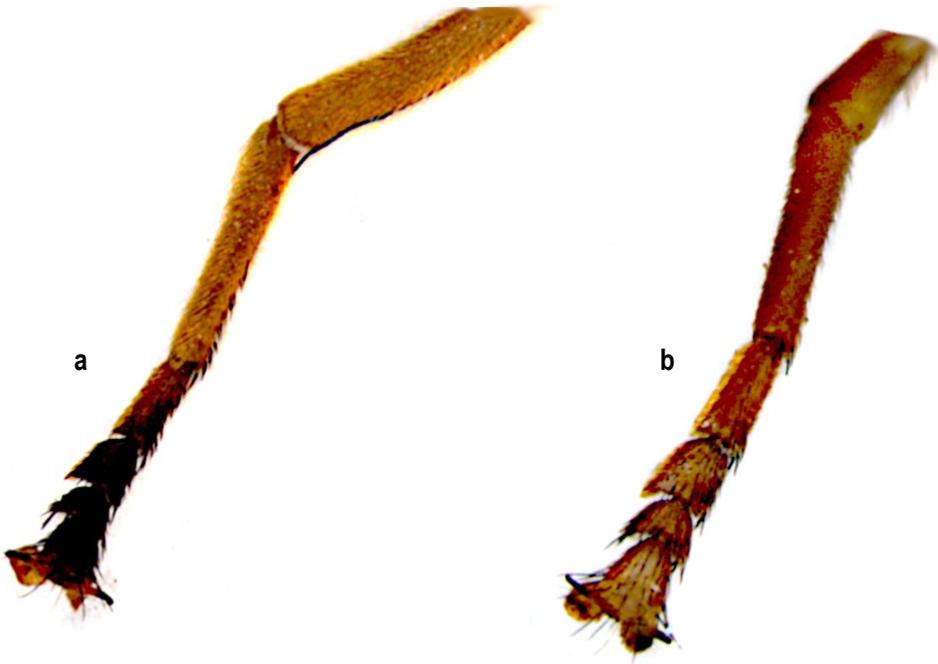


Figure 5. a) Tarsus of *Callicera aurata* (Fabricius, 1777), b) Tarsus of *Callicera aenea* (Fabricius, 1777).

Discussion

The results of the present study confirm the occurrence of the species *C. aenea* and reveal for the first time the existence of two other species of the same genus (*C. aurata* and *C. spinolae*) in Serbia.

Callicera aenea has been recorded only at one locality, Popovica in the Fruška Gora National Park. This area is characterized by ancient *Quercus/Fagus* forests. Fruška Gora is very rich in hoverflies, with more than 210 registered species (Šimić *et al.*, 2009). The relatively high number of recorded saproxylic species – 36 (Radenković *et al.*, 2013), indicates that forests are well preserved in this national park. Larvae of this species breed in rot-holes on *Fagus* (Rotheray, 1993).

Callicera spinolae has been recorded in the Đerdap (Iron Gate) National Park and in southern parts of Serbia (natural landscape Pčinja), while *Callicera aurata* has so far been found only on Mt. Kopaonik. The presence of species of this genus at only a few localities in Serbia, all of them belonging to protected areas, is a strong indicator that species from this genus are rare and that they should be added to the list of protected and strictly protected species of hoverflies in Serbia (Strictly Protected Wild Species of Plants, Animals and Fungi, Official Gazette of RS, no. 5/2010 and 47/2011).

The protection of *Callicera* species could be an additional argument for the conservation of some localities in national parks in Serbia. These species are typically connected to old trees (Speight, 2014) and their presence could be considered as an indicator of the well-preserved status of forests.

In light of the above, further studies of species of the *Callicera* genus, as well as a revision of the list of protected and strictly protected species, are much needed.

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References

- Hijmans, R. J., Guarino, L., & Mathur, P. (2012a). *DIVA-GIS. Version 7.5. Manual*. California, LizardTech, Inc.
- Hijmans, R. J., Guarino, L., & Mathur, P. (2012b). DIVA-GIS. Vsn. 7.5. A geographic information system for the analysis of species distribution data. Retrieved from <http://www.diva-gis.org>.
- Nedeljković, Z., Ricarte, A., Vujić, A., & Šimić, S. (2009). The genus *Callicera* PANZER (Diptera: Syrphidae), new to the Serbian fauna. *Studia dipterologica*, 16, 40-42.
- Radenković, S., Nedeljković, Z., Ricarte, A., Vujić, A. & Šimić, S. (2013). The saproxylic hoverflies (Diptera: Syrphidae) of Serbia. *Journal of Natural History*, 47 (1/2), 87-127.
- Rotheray, G.E. (1993). Colour guide to Hoverfly larvae (Diptera, Syrphidae). *Dipterists Digest*, 9, 1-156.
- Rotheray, G.E., & Gilbert, F. (2011). *The Natural History of Hoverflies*. Forrest Text, Ceredigion.
- Smit, J. (2014). Two new species of the genus *Callicera* Panzer (Diptera: Syrphidae) from the Palaearctic Region. *Zootaxa*, 3779 (5), 585–590.
- Speight, M.C.D. (1991). *Callicera aenea*, *C. aurata*, *C. fagesii*, *C. macquartii* redefined, with a key to and notes on the european *Callicera* species (Diptera: Syrphidae). *Dipterist Digest*, 10, 1-25. Speight, M. C. D. (2014). *Species accounts of European Syrphidae (Diptera)*, 2014. *Syrph the Net, the database of European Syrphidae*, vol. 78, Syrph the Net publications, Dublin.
- Šimić, S., Vujić, A., Radenković, S., & Radišić, P. (2009). Hoverflies (Insecta: Diptera: Syrphidae) of the Fruška gora mountain. In S. Šimić (ed.). *Invertebrates (Invertebrata) of the Fruška Gora Mountain* (pp. 77-89). Matica srpska, Novi Sad.
- Thompson, F.C., & Rotheray, G.E. (1998). Family Syrphidae. In L. Papp & B. Darvas (Eds.), *Contributions to a manual of palaearctic Diptera. Higher Brachycera* (pp. 81-139). Budapest Science Herald.
- Van Veen, M.P. (2004). *Hoverflies of Northwest Europe, Identification keys to the Syrphidae*. KNNV Publishing, Utrecht.
- Zimina, L.V. (1986). Review of Palearctic hover-flies of the genus *Callicera* Panzer (Diptera: Syrphidae). *Entomologicheskoye Obozreniye*, 3, 633-638.

НОВИ ПОДАЦИ О РОДУ *CALLICERA* PANZER, 1806 (DIPTERA: SYRPHIDAE) ЗА СРБИЈУ

ЗОРИЦА НЕДЕЉКОВИЋ, МАРИЈА МИЛИЧИЋ, ЛАУРА ЛИКОВ,
СНЕЖАНА РАДЕНКОВИЋ И АНТЕ ВУЈИЋ

Извод

У Србији је до сада забележена само једна врста рода *Callicera* Panzer, 1806 - *Callicera aenea* (Fabricius, 1777). Поред поновног налаза врсте *Callicera aenea*, у раду су дати први документовани налази за врсте *Callicera aurata* (Rossi, 1790) и *Callicera spinolae* Rondani, 1844. На основу прикупљеног и анализираног материјала, израђене су мапе дистрибуције као и кључ за одређивање српских врста овог рода.

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