



**BRACHYOPA BIMACULOSA DOCZKAL & DZIOCK 2004
AND CALLICERA FAGESII GUÉRIN-MÉNEVILLE, 1844,
TWO NEW HOVERFLIES (DIPTERA: SYRPHIDAE)
IN THE FAUNA OF SERBIA**

Mihailo VUJIĆ*, Ivan TOT

HabiProt, Cankareva 9/13, 21000 Novi Sad, Serbia

*Corresponding author; e-mail: mihailovujic01@gmail.com

Abstract – During a survey conducted in March and April 2020 on the Avala Mt., near to the capital city of Serbia, Belgrade, two new hoverfly species for the fauna of Serbia were collected – *Brachyopa bimaculosa* and *Callicera fagesii*. Both species were caught on mud on the forest road in a mixed deciduous forest. These species are saproxylic and their presence on the Avala Mt. indicates well-preserved forest habitats. Both species are registered in Serbia for the first time.

KEY WORDS: Eristalinae, saproxylic insects, forest habitats, faunistics

Izvešček – *BRACHYOPA BIMACULOSA* DOCZKAL & DZIOCK 2004 IN *CALLICERA FAGESII* GUÉRIN-MÉNEVILLE, 1844, DVE NOVI MUHI TREPETAVKI (DIPTERA: SYRPHIDAE) V FAVNI SRBIJE

Med raziskavo, izvedeno marca in aprila 2020, sta bili na gori Avali blizu glavnega mesta Srbije, Beograda, zbrani dve novi vrsti muh trepetavk za favno Srbije – *Brachyopa bimaculosa* in *Callicera fagesii*. Obe vrsti sta bili ujeti na blatu, na gozdni cesti v mešanem listnatem gozdu. Ti vrsti sta saproksilni in njuna prisotnost na Avali pomeni, da so gozdni habitati dobro ohranjeni. Obe vrsti sta v Srbiji prvič registrirani.

KLJUČNE BESEDE: Eristalinae, saproksilne žuželke, gozdni habitati, favnistika

Hoverflies (Syrphidae) are one of the most species-rich families of Diptera, with over 6000 described species in the world belonging to 188 genera (Thompson, 2013). European hoverfly fauna numbers more than 950 species and more than 412 are registered in Serbia (Vujić *et al.*, 2018; Van Steenis *et al.*, 2019; Speight, 2020; Vujić, 2020).

Brachyopa Meigen, 1822 are medium size, poorly haired hoverflies, with a yellow head, abdomen and usually thorax as well (Vujić, 1991). This genus doesn't show any clear sign of mimicry, and appears more like Muscidae or Scathophagidae. Adults usually can be found on bark or flowers of white umbellifers or *Crataegus* (Van Veen, 2004). In Europe 22 species occur and 11 of them were registered in Serbia: *B. bicolor* (Fallen, 1817), *B. dorsata* Zetterstedt, 1837, *B. grunewaldensis* Kassebeer, 2000, *B. insensilis* Collin, 1939, *B. maculipennis* Thompson, 1980, *B. panzeri* Goffe, 1945, *B. pilosa* Collin, 1939, *B. plena* Collin, 1939, *B. silviae* Doczkal & Dziock, 2004, *B. testacea* (Fallen, 1817) and *B. vittata* Zetterstedt, 1843 (Vujić *et al.*, 2018; Van Steenis *et al.*, 2019; Speight, 2020).

Callicera Panzer, 1809 are large, bee-mimic hoverflies, with long antennae and a black or metallic shiny body (Van Veen, 2004). Almost all species are orange-red or golden haired, and the metallic shine is more common in females. The genus *Callicera* can be distinguished from other hoverfly genera by a following combination of characters: antennae long (normally longer than the head, at least as long as the head), antennae with terminal style, entire body is black, without any yellow marks (usually with metallic shine), haired eyes, scutellum with a ventral hair fringe and cross-vein r-m is in basal half of cell dm (Smit, 2014). In Palaearctic region 9 species of the genus *Callicera* are present, while in Europe 6 species were registered (Smit, 2014; Speight, 2020). In Serbia, three species of this genus were recorded so far, *Callicera aenea* (Fabricius, 1777), *C. aurata* (Rossi, 1790) and *C. spinolae* Rondani, 1844 (Nedeljković *et al.*, 2009; Nedeljković *et al.*, 2015; Vujić *et al.*, 2018). The larvae of *Callicera* are saproxylic and can be found in rotten hardwood and rot-holes of different species of trees (van Veen, 2004; Speight, 2020).

The survey was conducted in 2020, and specimens were collected by a standard sweeping net method. The new species for the fauna of Serbia were registered at Čarapićev Brest, on Avala Mt., in the mixed deciduous forest of *Fagus*, *Quercus*, *Fraxinus*, *Acer*, *Robinia pseudoacacia*, *Prunus*, *Tilia* and some planted coniferous trees, such as *Abies alba* and *Pinus nigra*. Individuals of *Brachyopa bimaculosa* and *Callicera fagesii* were caught on mud on the forest road. The specimens were prepared by a standard procedure and identification was performed by using a key in Speight, 2017. All the data were entered into the database of Serbian insects – Alciphron (<http://alciphron.habiprot.org.rs/>). The maps were prepared in Alciphron database and QGIS 2.18.2. The collected specimens were deposited in private collection of Mihailo Vujić.

Two new species were registered for the first time on the territory of Serbia. Both species were collected in the mixed deciduous forest on Čarapićev Brest, on the Avala Mt., on March 21 and April 6, 2020. The locality where the specimens were collected is marked on the maps in Figures 1D and 1C.

Brachyopa bimaculosa Doczkal & Dziock 2004 (Fig. 1A)

Material examined: Serbia, Belgrade, Avala Mt., Čarapićev Brest, (Decimal Degrees: latitude: 44.694966 longitude: 20.524984), 6. IV 2020., 2♀, leg. M. Vujić.

Notes: New for the fauna of Serbia. Two female specimens were caught on mud, on a road in the mixed deciduous forest, mainly of *Fagus*, with sporadic trees of *Quercus*, *Acer*, *Fraxinus*, *Carpinus*, *Tilia*, *Robinia pseudoacacia* and planted coniferous trees of *Abies alba* and *Pinus nigra*. Photo of the habitat where *B. bimaculosa* was caught is presented in Figure 1C.

Callicera fagesii Guérin-Ménéville, 1844 (Fig. 1B)

Material examined: Serbia, Belgrade, Avala Mt., Čarapićev Brest, (Decimal Degrees: latitude: 44.694966 longitude: 20.524984), 21. III 2020., 1♀, leg. M. Vujić; 6. IV 2020., 2♀, leg. M. Vujić.

Notes: New for the fauna of Serbia. on the Avala Mt., three female specimens were caught in total, on mud, on a road in the mixed deciduous forest, mainly of *Fagus*, with sporadic trees of *Quercus*, *Acer*, *Fraxinus*, *Carpinus*, *Tilia*, *Robinia pseudoacacia*, but also planted evergreen trees, such as *Abies alba* and *Pinus nigra*. Photo of the habitat where *C. fagesii* was caught is presented on Figure 1C.

Brachyopa bimaculosa is a rare species which was registered only in three European countries so far: Germany, Greece and Slovenia (Speight, 2020). From other European species of the genus *Brachyopa*, *B. bimaculosa* can be separated by characters from the keys in Speight, 2017: arista with hairs no longer than a maximum diameter of arista, mesoscutal disc bluish grey to black, wings without dark marks, abdomen brownish orange or yellow, antennal segment 3 without sensory pit, proepimeron with long, pale, scattered hairs, each inner extremity of the transverse suture with a more or less shining patches, hind femur slender (more than 5 times as long as its maximum depth), mesoscutum without shining, black, undusted marks on each sides, posterior to the humeral callus and anterior to the transverse suture, haltere entirely yellow, all sternites entirely dusted and mid coxa bare posteriorly.

Callicera fagesii is a rare species which occurs in a deciduous forest, with ancient *Fagus* and *Quercus* trees. Their range includes a large part of Europe and some countries in Asia, it can be found in the Netherlands, Belgium, France (south to the Mediterranean, including Pyrenees), Germany, Portugal, Spain, Italy (including Sardinia), Greece, Turkey, some parts of the former Yugoslavia and Turkmenistan (Zimina, 1986, Speight, 2020). From other European species of the genus *Callicera*, this species can be separated by characters from the keys in Speight, 2017: antennal segment 2 no more than half as long as antennal segment 1, antennal segment 3 twice as long as antennal segments 1 + 2 together, hind femora angled ventrally, femora mostly black and tarsomeres 3-5 of all legs are also black, all hairs on scutellar disc are longer than antennal segment 1, hairs on general body surface are yellow-brown to grey brown, tergite 4 often black-haired, tibiae may be orange, but at least hind tibia often brownish or partly black. The most similar species to *C. fagesii* is *C. macquarti*, and adults of it fly in autumn (September and October), while *C. fagesii* adults fly in spring and summer (from the beginning of April to the end of June) (Speight, 2020). The first specimen caught on Avala Mt. was caught on March 21st and that

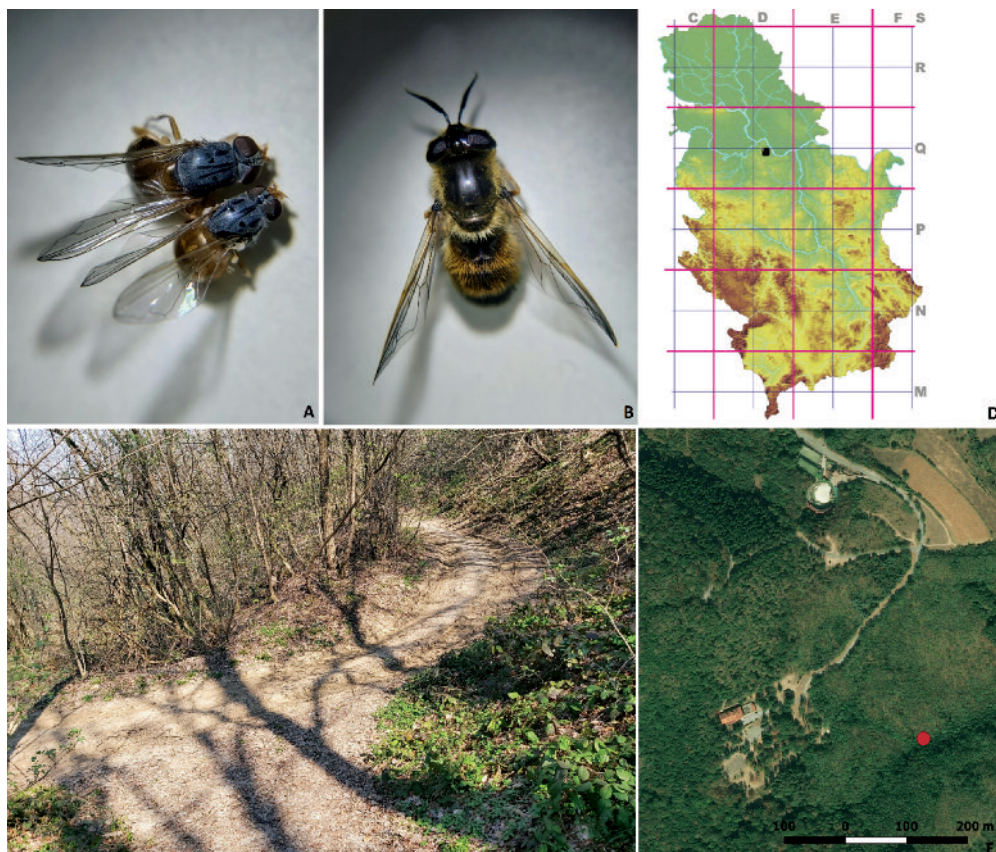


Fig. 1. A) *Brachyopa bimaculosa*, habitus of females; B) *Callicera fagesii*, habitus of a female; C) Photo of habitat of *B. bimaculosa* and *C. fagesii*; D) Locality where *B. bimaculosa* and *C. fagesii* were collected in Serbia; E) Locality where *B. bimaculosa* and *C. fagesii* were collected on Čarapićev Brest, Avala Mt.

can be explained due to the unusually mild winter and warm beginning of spring in Serbia. A few days after the first specimen was caught, there was a sudden rush of cold weather with snow and sub-zero temperatures lasting for several days, but specimens were also collected and observed after that.

Although most of the forests on the Avala Mt. are often logged and at these places usually young forests exist, on some parts, such as Čarapićev Brest, forests are well-preserved with many ancient trees of *Fagus*, *Quercus*, *Acer*, *Carpinus* and *Fraxinus*. The specimens in this paper were collected on a road in one of the well-preserved parts, where planted coniferous forest of *Abies alba* and *Pinus nigra*, as well as *Robinia pseudoacacia* were also present. The presence of the two saproxylic hoverflies presented in this paper, but also the presence of other saproxylic hoverflies and

beetles registered there, clearly indicates the importance of conservation of forest habitats of the Avala Mt.

Acknowledgments

The authors are thankful to Aleksa Maksimović for revision and correction of English of this article and Toni Koren for translating in Slovenian.

References

- Nedeljković, Z., Miličić, M., Likov, L., Radenković, S. & Vujić, A.,** 2015: New records of the genus *Callicera* Panzer, 1806 (Diptera: Syrphidae) from Serbia. *Acta entomologica serbica*, 20: 59-66.
- Nedeljković, Z., Ricarte, A., Vujić, A. & Šimić, S.,** 2009: The genus *Callicera* Panzer, 1806, new to the Serbian fauna. *Studia dipterologica*, 16: 40-42.
- 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. & Sarthou, J.-P.,** 2017: StN keys for the identification of the European species of various genera of Syrphidae 2017. *Syrph the Net, the database of European Syrphidae (Diptera)*, Vol. 99, 139 pp, Syrph the Net publications, Dublin.
- Speight, M.C.D.,** 2020: Species accounts of European Syrphidae, 2020. *Syrph the Net, the database of European Syrphidae (Diptera)*, vol. 104, 314 pp., *Syrph the Net publications*, Dublin
- Thompson, F. C.,** 2013: Syrphidae. *Systema Dipteroorum*, Version 1.5. 13354 records. Available on: <http://www.diptera.org/> [accessed on 5 September 2013].
- Van Steenis, J., Nedeljković, Z., Tot, T., Van der Ent, L.-J., Van Eck, A., Mazánek, L., Šebić, A., Radenković, S. & Vujić, A.,** 2019: New records of hoverflies (Diptera: Syrphidae) and the rediscovery of *Primocerioides regale* Violovitsh for the fauna of Serbia. *Biologia Serbica*, 41(1): 94-103.
- Van Veen, M.,** 2004: Hoverflies of Northwest Europe: identification keys to the Syrphidae. 256pp. *KNNV Publishing*, Utrecht.
- Vujić, A.,** 1991: Species of genus *Brachyopa* Meigen 1822 in Yugoslavia. - *Bulletin of Natural History Museum*, Belgrade, B 46, 141-150.
- Vujić, A., Radenković, S., Nedeljković, Z. & Šimić, S.,** 2018: A new check list of hoverflies (Diptera: Syrphidae) of the Republic of Serbia. *Matica srpska Journal for Natural Sciences*, 135: 7-51.
- Vujić, M.,** 2020: *Cheilosia herculana* Brădescu, 1982, a new hoverfly (Diptera: Syrphidae) species for the fauna of Serbia. *Acta entomologica serbica*, 25(1): xx-xx.
- Zimina, L.V.,** 1986: A review of palaearctic hoverflies of the genus *Callicera* Panzer (Diptera, Syrphidae). *USSR Review of Entomology*, 65: 633-638.

Received / Prejeto: 21. 4. 2020

