

# An update to the Tachinidae fauna of Croatia (Diptera)

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This paper updates the Tachinidae fauna of Croatia. We report 50 species for the first time for Croatia and six of these are new records for the Balkan Peninsula: *Chetogena micronychia*, *Istocheta subcinerea*, *Meigenia simplex*, *Leucostoma edentatum*, *Peribaea discicornis* and *P. longirostris*.

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## 1. Introduction

Tachinid flies are one of the largest families in the order Diptera and distinctly the largest group of the Calypttrata section (Tschorsnig & Richter 1998). Some of these insects are black, tiny and rarely seen in nature, while others are bright, large, and easily spotted in the field. The basic food requirements tachinids consume in the larval stage, but their adults, when visiting flowers, play a role as pollinators of some plants (Tooker *et al.* 2006, Al-Dobai *et al.* 2012). All known species of tachinids develop as obligate endoparasitoids in many insect host orders (predominantly moth caterpillars, but also sawfly larvae, beetle larvae and adults, crane fly larvae, bugs, etc.) and terrestrial noninsect arthropods (specifically centipedes and scorpions), and as such have a great ecological importance (Stireman *et*

*al.* 2006). Accordingly, the tachinids as a family have associations with wide range of hosts, but certain groups of tachinids have more specialized associations. However, not just diversity of hosts in the habitat, but also habitat connectivity that enables parasitoid spillover and other ecological factors determine diversity of tachinids (Stireman 2008, Inclán *et al.* 2014). Most tachinids are thermophilic, and the fauna of Southern Europe is therefore richer than that of Central Europe, where tachinids have been thoroughly studied (Tschorsnig & Herting 1994). There are also some species that have expanded their distribution to the north due to global warming (Zeegers 2010, Ziegler 2011). However, the fauna of several southeastern European countries remains relatively unknown and requires further investigation.

The most up-to-date checklist of Tachinidae

of the Balkan countries (Hubenov 2008a) lists 241 species for the fauna of Croatia. Croatia is a country that boasts a spectacular landscape and many rare habitats, and due to its specific geographical position that cover four biogeographical regions (Pannonian, Continental, Alpine and Mediterranean), it is possibly one of the richest European country in terms of biodiversity (Radović *et al.* 2009).

The aim of the present publication is to enrich knowledge of the Tachinidae fauna of Croatia by adding new faunistic records.

## 2. Materials and methods

The majority of the material originates from Gornji Muć (Fig. 1) and was collected in seasons of 2013 and 2014 using a modified Townes type Malaise trap (with a broader and higher “roof”). The trap was operated by the third author of this report (B. Kokan), and sorting of the material was carried out by the second author (M. Barták). Single specimens originating from other localities were collected by M. Barták in 2007; these specimens were sampled using a conventional entomological net.

After being preserved in ethanol (70%), all specimens were mounted dry using a method described by Barták (1997). With the exception of a duplicate specimen of *Chetogena micronychia*, which is deposited in the Stuttgart State Museum of Natural History (SMNS), all voucher specimens are deposited in the insect collection at the Czech University of Life Sciences Prague (CULSP). Full names of the localities are presented next to each recorded species while their coordinates and collectors are in Table 1.

The material was identified by the first author of this report (E. Lutovinovas). Species were identified in accordance to Cerretti (2010), but we also consulted Mesnil (1944–1975), Herting

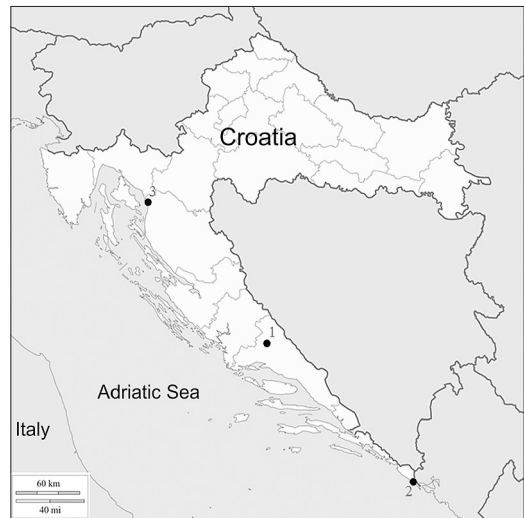


Fig. 1. Map of Croatia, showing studied localities. For numbering of localities, see Table 1.

(1983) as well as Cerretti and Tschorsnig (2008). Taxonomy of the species and their general distributions were acquired primarily from Herting and Dely-Draskovits (1993), but we also utilized other reference sources (Doğanlar 1982a, b, Draber-Moňko 1993, Andersen 1996, Tschorsnig & Herting 1998, Zeegers 1998, Kara & Alaoğlu 1999, Cerretti & Ziegler 2004, Vaňhara *et al.* 2004, Ostovan & Gheibi 2008, O’Hara *et al.* 2009, Cerretti 2010, Lutovinovas 2012, Gilasian *et al.* 2014a, b, Pohjoismäki & Kahanpää 2014). The species are listed alphabetically within each subfamily, which was done to avoid tribal division.

## 3. Results

Below, the 50 species new to Croatia are listed with those new for the whole Balkan Peninsula marked with an asterisk (\*).

Table 1. Details of sampling locations with collectors of Tachinidae in Croatia.

No.	Locality	Altitude	County	Coordinate	Collector
1	Gornji Muć	500 m	Split	43°41’27”N 16°29’44”E	B. Kokan
2	Molunat	150 m	Dubrovnik	42°28’52”N 18°25’57”E	M. Barták
3	Senj	seashore	Lika	44°58’26”N 14°55’13”E	M. Barták

### 3.1. Subfamily Dexiinae

*Blepharomyia pagana* (Meigen, 1824). – Material: Gornji Muć, 11.IV.–10.V.2014, 2♂♂, 2♀♀. – Distribution: all Europe northwards to Scotland and Lapland; Transcaucasia, S. Siberia (Herting & Dely-Draskovits 1993).

*Campylocheta inepta* (Meigen, 1824). – Material: Gornji Muć, 24.V.–28.VI.2014, 1♂; 29.VI.–20.VII.2014, 1♂; 15.–28.IX.2014, 1♀. – Distribution: all Europe northwards to Scotland and Finland; Transcaucasia, S. Siberia (Herting & Dely-Draskovits 1993, Pohjoismäki & Kahanpää 2014).

*Campylocheta latigena* Mesnil, 1974. – Material: Gornji Muć, 16.III.–11.IV.2014, 4♂♂, 1♀. – Distribution: Europe northwards to France and the Czech Rep. (Herting & Dely-Draskovits 1993, Vaňhara et al. 2004).

*Estheria picta* (Meigen, 1826). – Material: Gornji Muć, 28.VII.–11.VIII.2013, 1♀. – Distribution: Europe northwards to the Netherlands and vicinity of St. Petersburg; Transcaucasia, Kazakhstan, S. Siberia, Mongolia (Herting & Dely-Draskovits 1993, Zeegers 1998).

*Stomina tachinoides* (Fallén, 1817). – Material: Gornji Muć, 24.VIII.–14.IX.2014, 2♂♂. – Distribution: Europe northwards to C. Sweden and Finland; Palestine, Mongolia, China (Herting & Dely-Draskovits 1993, O'Hara et al. 2009, Pohjoismäki & Kahanpää 2014).

### 3.2. Subfamily Phasiinae

*Catharosia flavicornis* (Zetterstedt, 1859). – Material: Gornji Muć, 27.V.–22.VI.2013, 3♂♂; 22.VI.–28.VII.2013, 1♂; 11.VIII.–15.IX.2013, 1♂, 2♀♀. – Distribution: Europe northwards to France and S. Poland; Palestine, S. Siberia (Herting & Dely-Draskovits 1993).

*Clytiomya mesnili* Kugler, 1968. – Material: Senj, 18.V.2007, 1♂. – Distribution: S. Europe; Israel (Herting & Dely-Draskovits 1993).

*Cylindromyia crassa* (Loew, 1845). – Material: Gornji Muć, 22.VI.–13.VII.2013, 1♀. – Distribution: S. Europe northwards to Hungary; Palestine, Transcaucasia, Iran, S. Siberia

(Herting & Dely-Draskovits 1993, Gilasian et al. 2014b).

*Cylindromyia xyloina* (Egger, 1860). – Material: Gornji Muć, 27.V.–22.VI.2013, 1♀. – Distribution: Europe northwards to S. Germany and the Czech Rep. (Herting & Dely-Draskovits 1993, Vaňhara et al. 2004).

*Labigastera nitidula* (Meigen, 1824). – Material: Gornji Muć, 22.VI.–13.VII.2013, 1♀; 08.–28.VI.2014, 1♂. – Distribution: S. Europe northwards to Switzerland; Algeria, Palestine (Herting & Dely-Draskovits 1993).

*Labigastera pauciseta* (Rondani, 1861). – Material: Gornji Muć, 27.V.–22.VI.2013, 1♀; 29.VI.–20.VII.2014, 1♀. – Distribution: Europe northwards to S. Germany and the Czech Rep.; Turkey, Iran (Herting & Dely-Draskovits 1993, Kara & Alaoğlu 1999, Vaňhara et al. 2004, Gilasian et al. 2014a).

*Leucostoma anthracinum* (Meigen, 1824). – Material: Gornji Muć, 27.V.–11.VIII.2013, 2♂♂, 2♀♀; 24.V.–28.VI.2014, 1♂; 21.VII.–10.VIII.2014, 1♀. – Distribution: Europe northwards to Germany and vicinity of St. Petersburg; Transcaucasia, S. Siberia, Mongolia (Herting & Dely-Draskovits 1993).

\**Leucostoma edentatum* Kugler, 1978. – Material: Gornji Muć, 24.VIII.–14.IX.2014, 1♀. – Distribution: reported from Italy; Israel (Herting & Dely-Draskovits 1993, Cerretti 2010).

*Leucostoma tetraptera* (Meigen, 1824). – Material: Gornji Muć, 27.V.–22.VI.2013, 1♂; 22.VI.–28.VII.2013, 3♀♀; 28.VII.–11.VIII.2013, 1♀; 24.VIII.–14.IX.2014, 1♀. – Distribution: Europe northwards to France and the Czech Rep.; Morocco, Transcaucasia, S. Siberia (Herting & Dely-Draskovits 1993, Vaňhara et al. 2004).

*Leucostoma tunicum* Dupuis, 1964. – Material: Gornji Muć, 27.V.–22.VI.2013, 1♂, 1♀; 22.VI.–28.VII.2013, 3♀♀; 29.VI.–20.VII.2014, 1♀; 21.VII.–10.VIII.2014, 1♀; 10.–24.VIII.2014, 2♀♀; 24.VIII.–14.IX.2014, 1♀. – Distribution: Europe northwards to France and Slovakia (Herting & Dely-Draskovits 1993).

*Phania curvicauda* (Fallén, 1820). – Material: Gornji Muć, 27.V.–22.VI.2013, 1♀. – Distribution: Europe northwards to C. Sweden and

Finland (Herting & Dely-Draskovits 1993, Pohjoismäki & Kahanpää 2014).

### 3.3. Subfamily Tachininae

*Actia infantula* (Zetterstedt, 1844). – Material: Gornji Muć, 27.V.–22.VI.2013, 1♂; 29.VI.–20.VII.2014, 1♂; 21.VII.–10.VIII.2014, 1♂.

– Distribution: all Europe northwards to England and Finland; Morocco, Tunisia, Palestine, Transcaucasia, S. Siberia (Herting & Dely-Draskovits 1993, Andersen 1996, Pohjoismäki & Kahanpää 2014).

*Ceromya flavisetata* (Villeneuve, 1921). – Material: Gornji Muć, 10.–24.VIII.2014, 2♂♂. – Distribution: Europe northwards to Denmark and Poland; China (Draber-Moňko 1993, Herting & Dely-Draskovits 1993, Andersen 1996, O'Hara *et al.* 2009).

*Macquartia tessellum* (Meigen, 1824). – Material: Gornji Muć, 24.V.–28.VI.2014, 2♂♂, 5♀♀. – Distribution: Europe northwards to Switzerland and Slovakia; Canary Is., Palestine, Turkey, Transcaucasia, Iran, Tadjikistan, China; Oriental Region (Doğanlar 1982b, Herting & Dely-Draskovits 1993, Ostovan & Gheibi 2008, O'Hara *et al.* 2009).

*Pelamera atra* (Rondani, 1861). – Material: Gornji Muć, 27.IV.–10.V.2014, 1♀. – Distribution: reported from Italy, Switzerland and Greece (Herting & Dely-Draskovits 1993, Cerretti & Ziegler 2004).

\**Peribaea discicornis* (Pandellé, 1894). – Material: Gornji Muć, 27.IV.–23.V.2014, 1♂; 29.VI.–20.VII.2014, 1♂; 10.–24.VIII.2014, 1♂. – Distribution: S. Europe northwards to Switzerland; Tunisia (Herting & Dely-Draskovits 1993, Andersen 1996).

\**Peribaea longirostris* Andersen, 1996. – Material: Gornji Muć, 22.VI.–28.VII.2013, 1♂; 08.–28.VI.2014, 1♂. – Distribution: Europe northwards to the Netherlands and Finland (Andersen 1996, Zeegers 1998, Lutovinovas 2012, Pohjoismäki & Kahanpää 2014).

*Plesina claripennis* Mesnil, 1953. – Material: Gornji Muć, 11.VIII.–15.IX.2013, 1♀. – Distribution: reported from Greece; Palestine (Cerretti & Tschorsnig 2008, Zeegers 2017).

*Siphona paucisetata* Rondani, 1865. – Material:

Gornji Muć, 28.VII.–11.VIII.2013, 1♀; 11.VIII.–15.IX.2013, 1♀; 08.–28.VI.2014, 1♂. – Distribution: all Europe northwards to England and Finland; S. Siberia, Mongolia, China, Kuril Is. (Herting & Dely-Draskovits 1993, Andersen 1996, O'Hara *et al.* 2009).

*Triarthria setipennis* (Fallén, 1810). – Material: Gornji Muć, 16.III.–26.IV.2014, 1♂; 27.IV.–23.V.2014, 1♂; 24.V.–28.VI.2014, 3♀♀; 15.–28.IX.2014, 1♀. – Distribution: all Europe northwards to Scotland and Finland; Palestine, Transcaucasia (Herting & Dely-Draskovits 1993, Pohjoismäki & Kahanpää 2014).

*Zimonia masiceraeformis* (Portshinsky, 1881). – Material: Gornji Muć, 27.V.–22.VI.2013, 2♂♂, 1♀; 24.V.–28.VI.2014, 4♀♀; 29.VI.–20.VII.2014, 2♀♀; 29.IX.–10.X.2014, 1♀. – Distribution: S. Europe northwards to Switzerland; Israel, Transcaucasia, Tadjikistan (Herting & Dely-Draskovits 1993).

### 3.4. Subfamily Exoristinae

*Atylomyia loewii* Brauer, 1898. – Material: Gornji Muć, 29.VI.–20.VII.2014, 1♀. – Distribution: Europe northwards to Lithuania; Israel, S. Siberia, Mongolia (Herting & Dely-Draskovits 1993, Lutovinovas 2012).

*Blondelia nigripes* (Fallén, 1810). – Material: Gornji Muć, 10.–24.VIII.2014, 1♂. – Distribution: all Europe northwards to England and N. Sweden; Transcaucasia, C. Asia, S. Siberia, Mongolia, China, Japan, Kuril Is. (Herting & Dely-Draskovits 1993, O'Hara *et al.* 2009).

*Brachicheta strigata* (Meigen, 1824). – Material: Gornji Muć, 16.III.–11.IV.2014, 1♀. – Distribution: all Europe northwards to Scotland and Finland; Transcaucasia (Herting & Dely-Draskovits 1993, Pohjoismäki & Kahanpää 2014).

*Cadurcia casta* (Rondani, 1861). – Material: Gornji Muć, 29.VI.–20.VII.2014, 1♀. – Distribution: S. Europe; Turkey, Transcaucasia (Herting & Dely-Draskovits 1993).

*Ceratochaetops delphinensis* (Villeneuve, 1931). – Material: Gornji Muć, 27.V.–22.VI.2013, 1♀. – Distribution: reported from France,

- Greece; S. Siberia, Mongolia (Herting & Dely-Draskovits 1993, Cerretti & Ziegler 2004).
- Chetina setigena* (Rondani, 1856). – Material: Gornji Muć, 27.V.–22.VI.2013, 3♂♂, 5♀♀; 22.VI.–28.VII.2013, 2♂♂, 9♀♀; 28.VII.–11.VIII.2013, 1♂, 6♀♀; 11.VIII.–15.IX.2013, 2♀♀; 24.V.–28.VI.2014, 1♂; 29.VI.–20.VII.2014, 1♂; 21.VII.–10.VIII.2014, 8♀♀; 24.VIII.–14.IX.2014, 2♀♀. – Distribution: S. Europe northwards to C. France; Israel, Transcaucasia, Turkmenia, Tajikistan (Herting & Dely-Draskovits 1993).
- \**Chetogena micronychia* (Masson, 1969). – Material: Gornji Muć, 27.V.–22.VI.2013, 3♂♂, 2♀♀; 22.VI.–28.VII.2013, 9♂♂, 7♀♀; 28.VII.–11.VIII.2013, 2♂♂, 3♀♀; 11.VIII.–15.IX.2013, 2♀♀; 15.IX.–06.X.2013, 1♀; 24.V.–28.VI.2014, 1♀; 29.VI.–20.VII.2014, 2♀♀; 21.VII.–10.VIII.2014, 1♀. – Distribution: reported from France and Italy (Herting & Dely-Draskovits 1993, Inclán 2016).
- Eumea linearicornis* (Zetterstedt, 1844). – Material: Molunat, 21.V.2007, 1♀. – Distribution: all Europe northwards to England and Finland; Transcaucasia, S. Siberia, China, Japan, Kuril Is. (Herting & Dely-Draskovits 1993, O'Hara et al. 2009, Pohjoismäki & Kahanpää 2014).
- \**Istocheta subcinerea* (Borisova–Zinoveva, 1966). – Material: Gornji Muć, 22.VI.–13.VII.2013, 1♀; 27.IV.–10.V.2014, 1♀. – Distribution: reported from Italy and Ukraine; S. Siberia (Herting & Dely-Draskovits 1993, Cerretti 2010, Pohjoismäki & Kahanpää 2014).
- Ligeria angusticornis* (Loew, 1847). – Material: Gornji Muć, 28.VII.–11.VIII.2013, 2♀♀; 11.VIII.–15.IX.2013, 2♀♀. – Distribution: all Europe northwards to England and Finland; Palestine, Transcaucasia, S. Siberia (Herting & Dely-Draskovits 1993, Pohjoismäki & Kahanpää 2014).
- Ligeriella aristata* (Villeneuve, 1911). – Material: Gornji Muć, 08.–28.VI.2014, 1♂. – Distribution: Europe northwards to Finland; Tadjikistan, Mongolia, China (Herting & Dely-Draskovits 1993, O'Hara et al. 2009, Pohjoismäki & Kahanpää 2014).
- Lomachantha parra* Rondani, 1859. – Material: Gornji Muć, 21.VII.–10.VIII.2014, 1♀. – Distribution: Europe northwards to Germany and Slovakia; Transcaucasia, Uzbekistan (Herting & Dely-Draskovits 1993).
- Lydella grisescens* Robineau–Desvoidy, 1830. – Material: Senj, 18.V.2007, 1♂. – Distribution: Europe northwards to England and Germany; Israel, Transcaucasia, Tadjikistan, Mongolia, S. Siberia, China (Herting & Dely-Draskovits 1993, O'Hara et al. 2009).
- Medina collaris* (Fallén, 1820). – Material: Gornji Muć, 24.V.–28.VI.2014, 1♀; 24.VIII.–14.IX.2014, 1♀. – Distribution: all Europe northwards to Scotland and Finland; Transcaucasia, Mongolia, S. Siberia, China, Kuril Is. (Herting & Dely-Draskovits 1993, O'Hara et al. 2009, Pohjoismäki & Kahanpää 2014).
- \**Meigenia simplex* Tschorsnig & Herting, 1998. – Material: Senj, 18.V.2007, 1♂. – Distribution: S. Europe northwards to Switzerland; Turkey (Tschorsnig & Herting 1998).
- Oswaldia spectabilis* (Meigen, 1824). – Material: Gornji Muć, 21.VII.–10.VIII.2014, 1♀. – Distribution: Europe northwards to C. Sweden and Finland; Transcaucasia (Herting & Dely-Draskovits 1993, Pohjoismäki & Kahanpää 2014).
- Pales pumicata* (Meigen, 1824). – Material: Gornji Muć, 24.V.–08.VI.2014, 1♀. – Distribution: S. Europe northwards to Switzerland (Herting & Dely-Draskovits 1993).
- Paratryphera barbatula* (Rondani, 1859). – Material: Gornji Muć, 28.VII.–11.VIII.2013, 2♀♀; 11.VIII.–15.IX.2013, 1♀; 29.VI.–20.VII.2014, 1♀. – Distribution: Europe northwards to Finland; Israel, Transcaucasia, S. Siberia, Mongolia, China, Japan, Kuril Is. (Herting & Dely-Draskovits 1993, O'Hara et al. 2009, Pohjoismäki & Kahanpää 2014).
- Paratryphera bisetosa* (Brauer & Bergenstamm, 1891). – Material: Gornji Muć, 24.VIII.–14.IX.2014, 1♀. – Distribution: Europe northwards to Switzerland and Slovakia; China, Japan (Herting & Dely-Draskovits 1993, Vaňhara et al. 2004, O'Hara et al. 2009).
- Phryno vetula* (Meigen, 1824). – Material: Gornji Muć, 11.–27.IV.2014, 1♂. – Distribution:

Europe northwards to England and Denmark; Turkey, Transcaucasia, S. Siberia, China (Doğanlar 1982a, Herting & Dely-Draskovits 1993, O'Hara *et al.* 2009).

*Phryxe magnicornis* (Zetterstedt, 1838). – Material: Gornji Muć, 10.–24.VIII.2014, 1♂. – Distribution: all Europe northwards to Scotland and Finland; Transcaucasia, S. Siberia, Mongolia, China, Kuril Is. (Herting & Dely-Draskovits 1993, O'Hara *et al.* 2009, Pohjoismäki & Kahanpää 2014).

*Platymya fimbriata* (Meigen, 1824). – Material: Gornji Muć, 27.V.–22.VI.2013, 4♀♀; 24.V.–08.VI.2014, 1♀. – Distribution: all Europe northwards to England and Lapland; Israel, Transcaucasia, C. Asia, S. Siberia, Mongolia, China, Kuril Is. (Herting & Dely-Draskovits 1993, O'Hara *et al.* 2009).

*Smidtia amoena* (Meigen, 1824). – Material: Gornji Muć, 10.–24.V.2014, 1♀. – Distribution: all Europe northwards to England and Finland; Transcaucasia, Kazakhstan, Tadjikistan, S. Siberia, China, Japan (Herting & Dely-Draskovits 1993, O'Hara *et al.* 2009, Pohjoismäki & Kahanpää 2014).

*Thecocarcelia acutangulata* (Macquart, 1850). – Material: Gornji Muć, 27.V.–22.VI.2013, 1♀. – Distribution: Europe northwards to the Netherlands and the Czech Rep.; Transcaucasia, Japan (Herting & Dely-Draskovits 1993, Vaňhara *et al.* 2004, Zeegers 2010).

#### 4. Discussion

Hubenov (2008a) listed 241 species for the fauna of Croatia, which is certainly an incomplete representation of the real fauna, when numbers of known species from neighbouring countries are taken into account. The tachinid fauna of Croatia is perhaps two-fold. In the present study, 50 species were recorded for the first time for Croatia, increasing the known fauna of this country to 291 species. Our list includes many species that are considered common all over Europe (e.g. *Blondelia nigripes*, *Medina collaris*, *Triarthria setipennis*), but we also detected some rarely recorded species, registered from fewer countries (e.g. *Ceratochaetops delphinensis*, *Pelamera atra*, *Plesina claripennis*), which have been re-

ported only from Greece among the Balkan countries (Cerretti & Ziegler 2004, Zeegers 2017). Hubenov (2008a) noted that the known tachinid fauna of Croatia is most similar to that of Greece among the Balkan countries, which is also demonstrated in this publication by the unique records common with Greece.

Among the new records for Croatia, the following six species were newly recorded also for the Balkan Peninsula: *Chetogena micronychia*, *Istocheta subcinerea*, *Meigenia simplex*, *Leucostoma edentatum*, *Peribaea discicornis* and *P. longirostris*. Adding these records, 614 species in total are known from the Balkan countries (Hubenov 2008a, b, Ziegler 2010, Pohjoismäki *et al.* 2016, Zeegers 2017). However, this is still an incomplete number of the Balkan species as there are some unpublished records (H.-P. Tschorsnig, pers. comm.).

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