

## New faunistic records of the genus *Limonia* MEIGEN (Limoniidae, Diptera, Insecta) from the Balkan region

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**Summary:** Three species of *Limonia* MEIGEN (Diptera: Limoniidae) are recorded here for the first time from countries within the Balkan region. Here we report *Limonia pannonica* (KOWARZ, 1868) from the Republic of Macedonia, *L. phragmitidis* (SCHRANK, 1781) from Greece, and *L. splendens* (KUNTZE, 1920) from Montenegro and Serbia.

**Key words:** *Limonia splendens*, *Limonia pannonica*, *Limonia phragmitidis*, distribution, genitalia, wings

### Introduction

Short-palped crane flies (Limoniidae) are the largest tipuloid family, with about 10,600 recognized species (OOSTERBROEK 2017). Some authors suggest that the family is paraphyletic, having highly divergent tipuloid-like features in regards of their general morphology and genetic structures (PETERSEN *et al.* 2010, ZHANG *et al.* 2016). The genus *Limonia* is the type genus of the Limoniinae subfamily and contains 28 species in the West-Palaearctic area (STARÝ 2017, OOSTERBROEK 2017). Species of the genus are medium sized, with body length and wings both varying from 6 mm to 17 mm (STARÝ 1990, STARÝ and SALMELA 2004, STARÝ 2017). Body colour across the species ranges from yellow to black. The wings are mostly transparent, but some are spotted or have dark markings, or a combination of both. Many *Limonia* species are widely distributed and can be common in various habitats (for example *Limonia macrostigma* (SCHUMMEL, 1829), and *Limonia nubeculosa* MEIGEN, 1804) (SALMELA 2001, KRAMER 2011, KOLCSÁR *et al.* 2013). However some have a far more restricted distribution or are known only from specific countries such as *Limonia aquilina* STARÝ, 1984 (Czech Republic, Slovakia and Finland (Jukka SALMELA pers. comm. ), *Limonia messaurea messaurea* MENDL, 1971 (Sweden, Finland, and North Korea), *Limonia nussbaumi* STARÝ and FREIDBERG, 2007 (Eastern Mediterranean to the Middle East) (STARÝ and BARTÁK 2005, SALMELA 2012, KOÇ *et al.* 2016). Larvae are phytophagous, mycetophagous or detritivorous, living in various substrates like mud, sand, rotting wood, and wet leaf litter or are associated with the soft fruiting bodies of various

fungi (KRAMER 2011, KRIVOSHEINA and KRIVOSHEINA 2011, OOSTERBROEK 2017).

Despite the fact that they are conspicuous and occur in high numbers in their habitats, *Limonia* appear to be insufficiently studied in the Balkans and here we report new records of three *Limonia* species.

### Material and Methods

Specimens were collected from Macedonia, Montenegro and Greece between 2010 and 2012. Material was preserved in 70% ethanol and is stored in Diptera Collection of the Faculty of Biology and Geology, Babeş-Bolyai University, Cluj-Napoca, Romania (DCBBU). The material was identified by KOLCSÁR L.-P. and KERESZTES L. using an Olympus SZ61 stereomicroscope. Layer photos were taken using an Olympus SZ61 stereomicroscope (in the case of the wings) or using an Optika microscope (for genitalia) equipped with a Canon 650D camera and a LMDigital SLR Adapter. Layer photos were combined using Zerene Stacker software. All collection data are listed in Table 1 and also are available on the TransDiptera Online Database (KOLCSÁR *et al.* 2017).

### Results

During our investigation a number of 649 specimens, belonging to *Limonia pannonica* (KOWARZ, 1868), *Limonia phragmitidis* (SCHRANK, 1781) and *Limonia splendens* KUNTZE, 1920 were identified. We list in the text only the locations which represents the first record for a species from a country. For a complete list of data see Table 1.

New faunistic records:

***Limonia pannonica*** (KOWARZ, 1868) (Fig. 1-3, 4A.).

*Material examined:* Republic of Macedonia, Vevcani, Jablanica mts., Jabalanica NP, 1407 m, 41.2491° N 20.5623° E, 05.05.2012, 2 males, leg. TÖRÖK E., KOLCSÁR L.-P., KERESZTES L.; Bratin Dol, Pelister mts., brook, 875 m, 41.0694° N 21.2344° E, 04.05.2012, 1 male, 2 females, leg. KOLCSÁR L.-P.

*Distribution:* A West-Palaeartic species, reported from the following European countries: Austria, Czech Republic, Hungary, Italy, Moldavia, Romania, Slovakia, European and Asian parts of Turkey, and Ukraine. From the Balkans it is reported from Albania, Bulgaria, Greece and Serbia (OOSTERBROEK 2017). Here we note it new to Macedonia (Fig. 1).

*Remarks:* Despite its distribution within Central Europe to Anatolia, it is a poorly known species. Specimens have been collected mostly in semi-dry to dry habitats in warm deciduous forests and forest-steppes (STARÝ 2009) or dry pine forests (STARÝ and OOSTERBROEK 2008, KOLCSÁR *et al.* 2013). UJVÁROSI *et al.* (2011) reported the species (a single specimen) from wetland (along marshy springs), but most probably the fly was a stray from nearby dryer habitats. We collected the species from dry sweet chestnut (*Castanea sativa*) forest in Vevcani, and from pine (*Pinus* sp.) forest in Bratin Dol. This fly is on the Red List of threatened species in the Czech Republic (STARÝ and BARTÁK 2005). The femora, wing and male genitalia are scarcely illustrated in literature and we present here the first photos of these features. (Fig. 2, Fig. 3, Fig. 4A).

***Limonia splendens*** (KUNTZE, 1920) (Fig. 4B, 5-7.).

*Material examined:* Montenegro, Rasova, Tara Canyon, Đurđevića Tara Bridge, 737 m, N 43.1484° N 19.2924° E, 09.05.2010, 8 males, 2 females, leg. KOLCSÁR L.-P.; Gruda, Lovcen mts., Cetinje, 680 m, 42.3873° N 18.9330° E, 12.05.2010, 3 males and 1 female, leg. KOLCSÁR L.-P. Serbia, Kopaonik, Kopaonik Mts., 1600 m, 43.2981° N 20.7871° E, 22.06.2017, 1 female, leg. KOLCSÁR L.-P., TÖRÖK E.; Kopaonik, Kopaonik Mts., 1744 m, 43.3137° N 20.8373° E, 22.06.2017, 13 males, 1 females, leg. KOLCSÁR L.-P., TÖRÖK E.

*Distribution:* This is a West-Palaeartic species, previously reported from the following countries: Austria, Bulgaria, Greece, Hungary, Italy, Macedonia, Slovakia, Georgia, Asiatic part of Turkey (Van province) (OOSTERBROEK 2017). Here we report the fly for the first time from Montenegro and Serbia (Fig. 5).

*Remarks:* Originally the fly was described as a species in its own right (KUNTZE 1920), but later was synonymised as just a colour variation of *Limonia*

*pannonica* (LACKSCHEWITZ 1928, LACKSCHEWITZ and PAGAST 1940). STARÝ (1990) demonstrated that *L. pannonica* and *L. splendens* were in fact different from each other and from the similar *L. maculipennis* (MEIGEN, 1818) in the colouration of the abdomen, the structure of the hypopygium (Fig. 2,6) and wing features (Fig. 4). The femora, wing and the male genitalia are rarely illustrated and here we present the first photos of them (Fig. 6-7, Fig. 4B). Little is known about the biology of the species and specimens noted here were collected from dry *Pinus* sp. and *Quercus* sp. forests, during early May in Montenegro, and in an alpine pasture with some small *Picea* sp. trees in Serbia.

***Limonia phragmitidis*** (SCHRANK, 1781) (Fig. 8-9.).

*Material examined:* Greece, Galani, Nestos River, 48 m, 41.0919° N 24.7595° E, 06.05.2011, 1 male, leg. KOLCSÁR L.-P.

*Distribution:* This is a widely distributed species in the Palaeartic area, and is present in most European countries. In the Balkan region it is known from Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Serbia and Turkey (European part: Edirne, Kirklareli). Here we report it for the first time from Greece (Fig. 8).

*Remarks:* The species is one of the most abundant and most frequently collected *Limonia* species in Europe (Fig. 9), commonly found in wet wooded, and humid ecosystems, having semi-aquatic larvae (DRAKE 2011, KOLCSÁR *et al.* 2013). We collected the species in willow (*Salix* sp.) forest along the Nestos River.

## Aknowledgements

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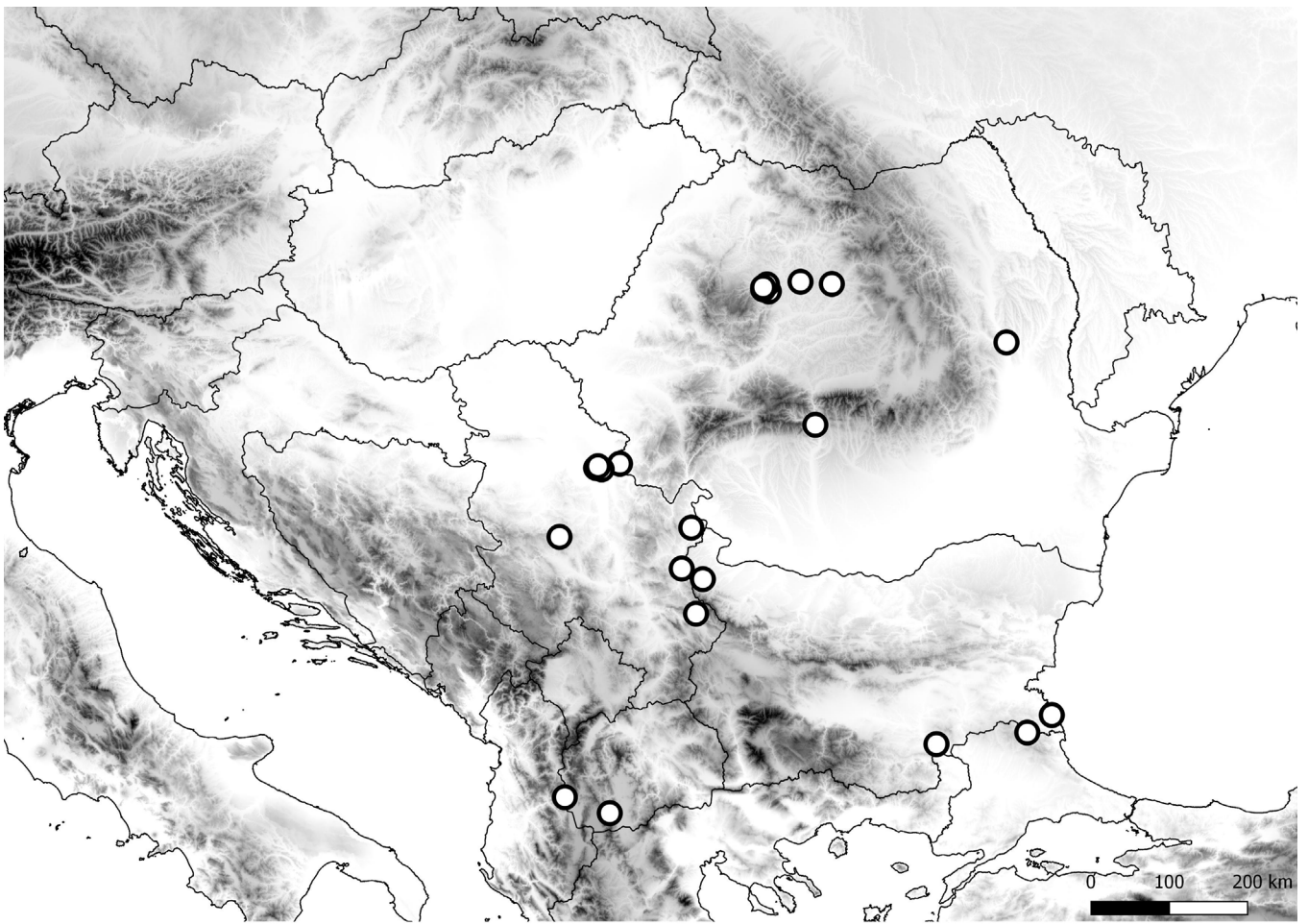


Fig. 1. Location of collection sites of *Limonia pannonica* (KOWARZ, 1868).

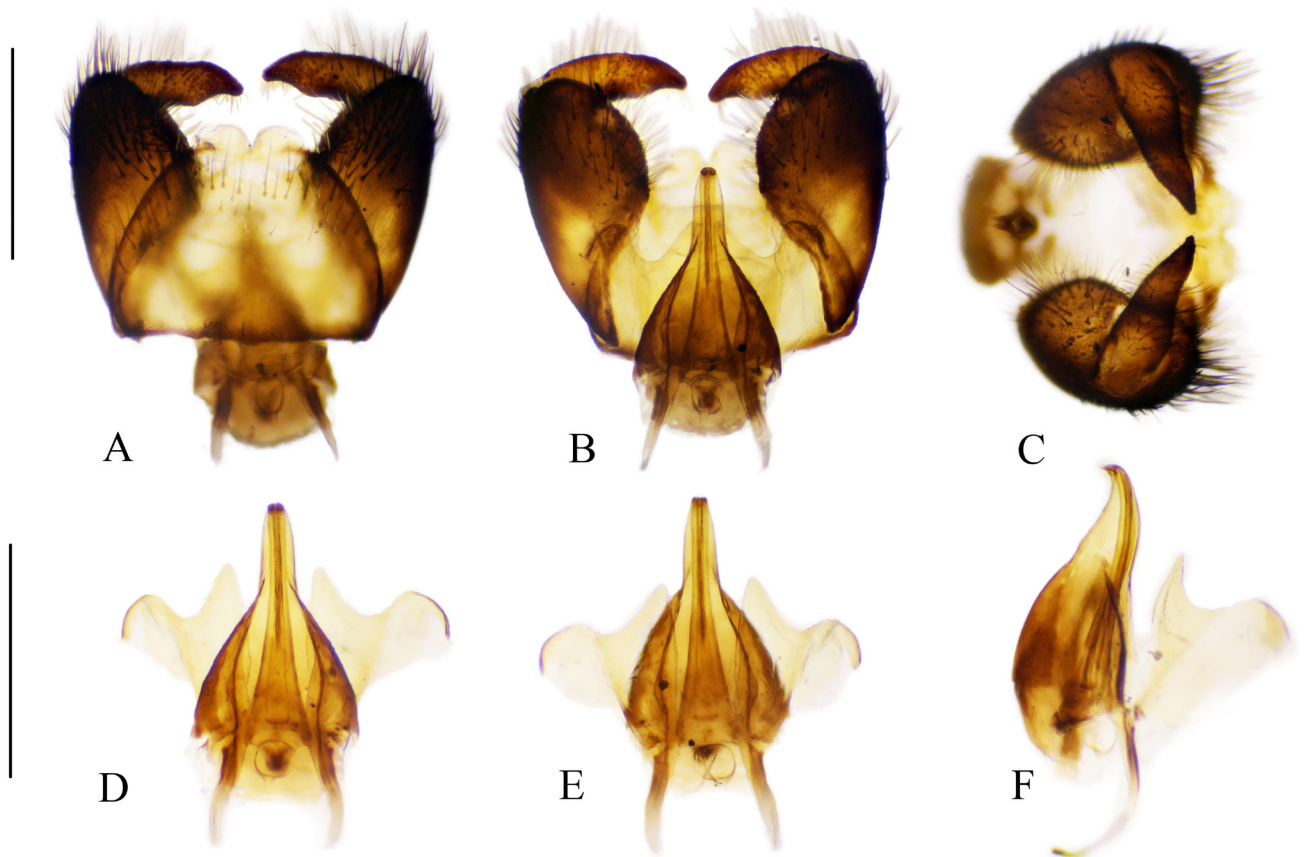


Fig. 2. *Limonia pannonica* (KOWARZ, 1868): A–C male hypopygium, A – dorsal view, B – ventral view, C – caudal view; D–F aedeagal complex, D – dorsal view, E – ventral view, F – lateral view. Scale bars: 0.5 mm



Fig. 3. Femora of *Limonia pannonica* (KOWARZ, 1868): A – fore, B – mid, C – hind. Scale bar: 0.5 mm.



Fig. 4. Wings: A – *Limonia pannonica* (KOWARZ, 1868), B – *Limonia splendens* (KUNTZE, 1920). Scale bar: 1 mm.

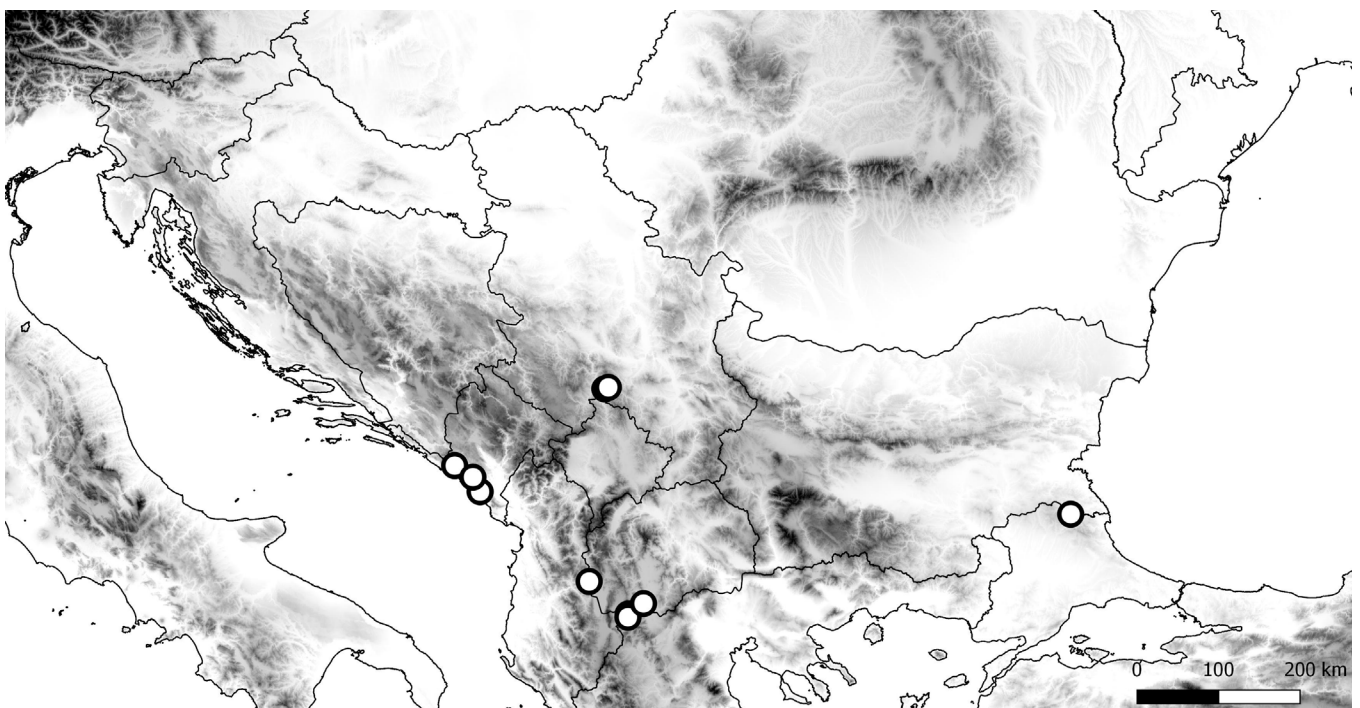


Fig. 5. Location of collection sites of *Limonia splendens* (KUNTZE, 1920).

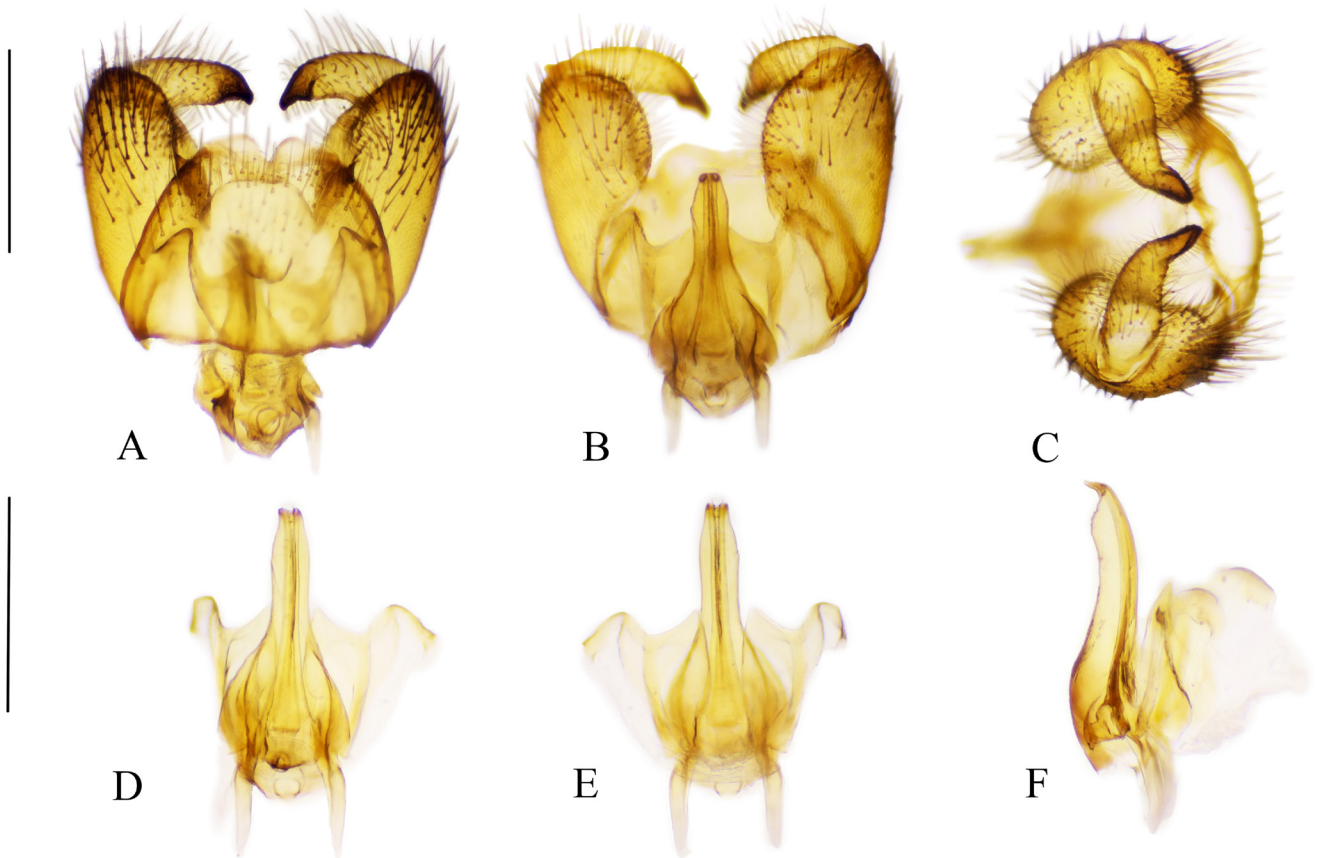


Fig. 6. *Limonia splendens* (KUNTZE, 1920): A–C male hypopygium, A – dorsal view, B – ventral view, C – caudal view; D–F aedeagal complex, D – dorsal view, E – ventral view, F – lateral view. Scale bars: 0.5 mm.



Fig. 7. Femora of *Limonia splendens* (KUNTZE, 1920): A – fore, B – mid, C – hind. Scale bar: 0.5 mm.

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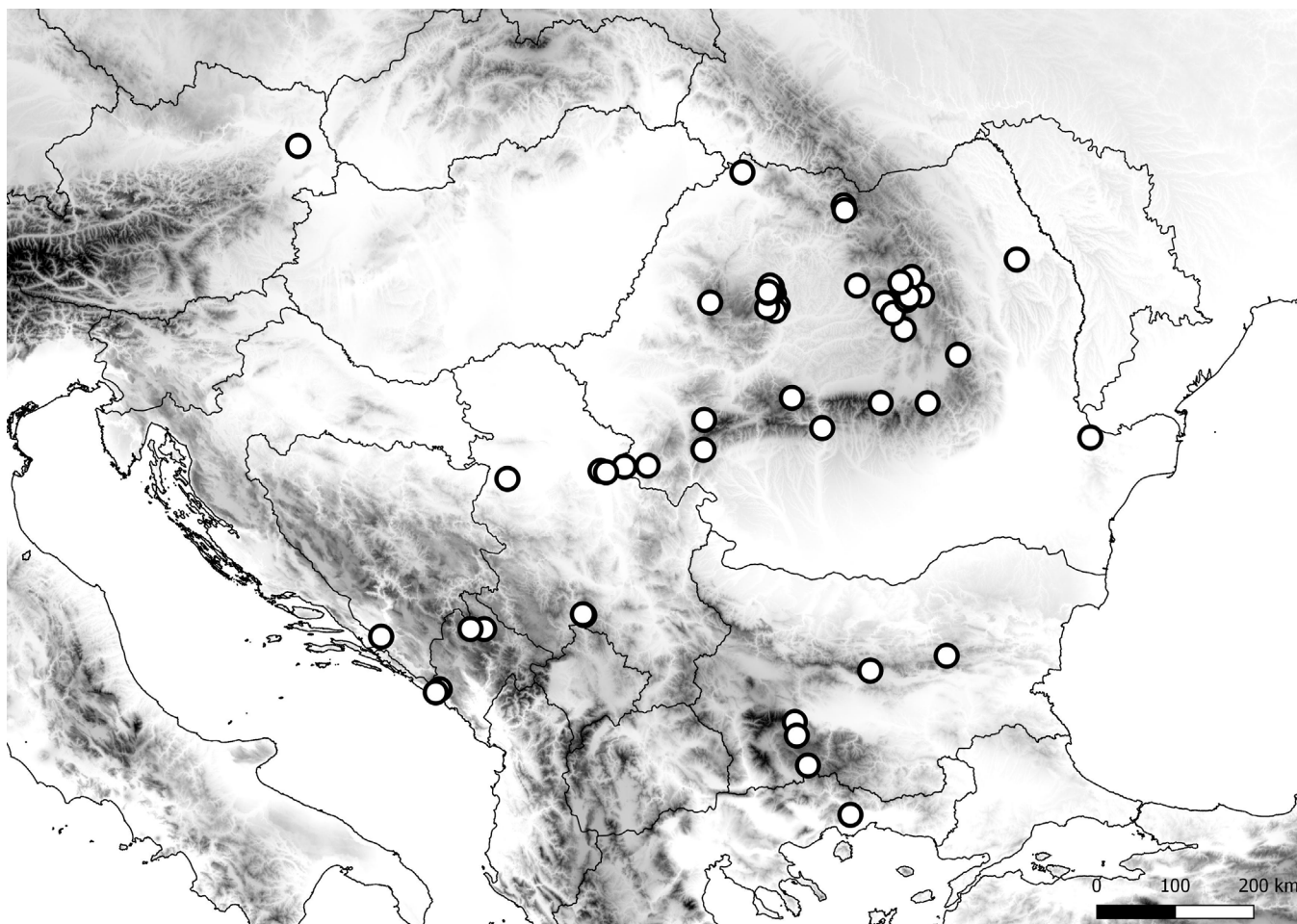


Fig. 8. Location of collection sites of *Limonia phragmitidis* (SCHRANK, 1781).

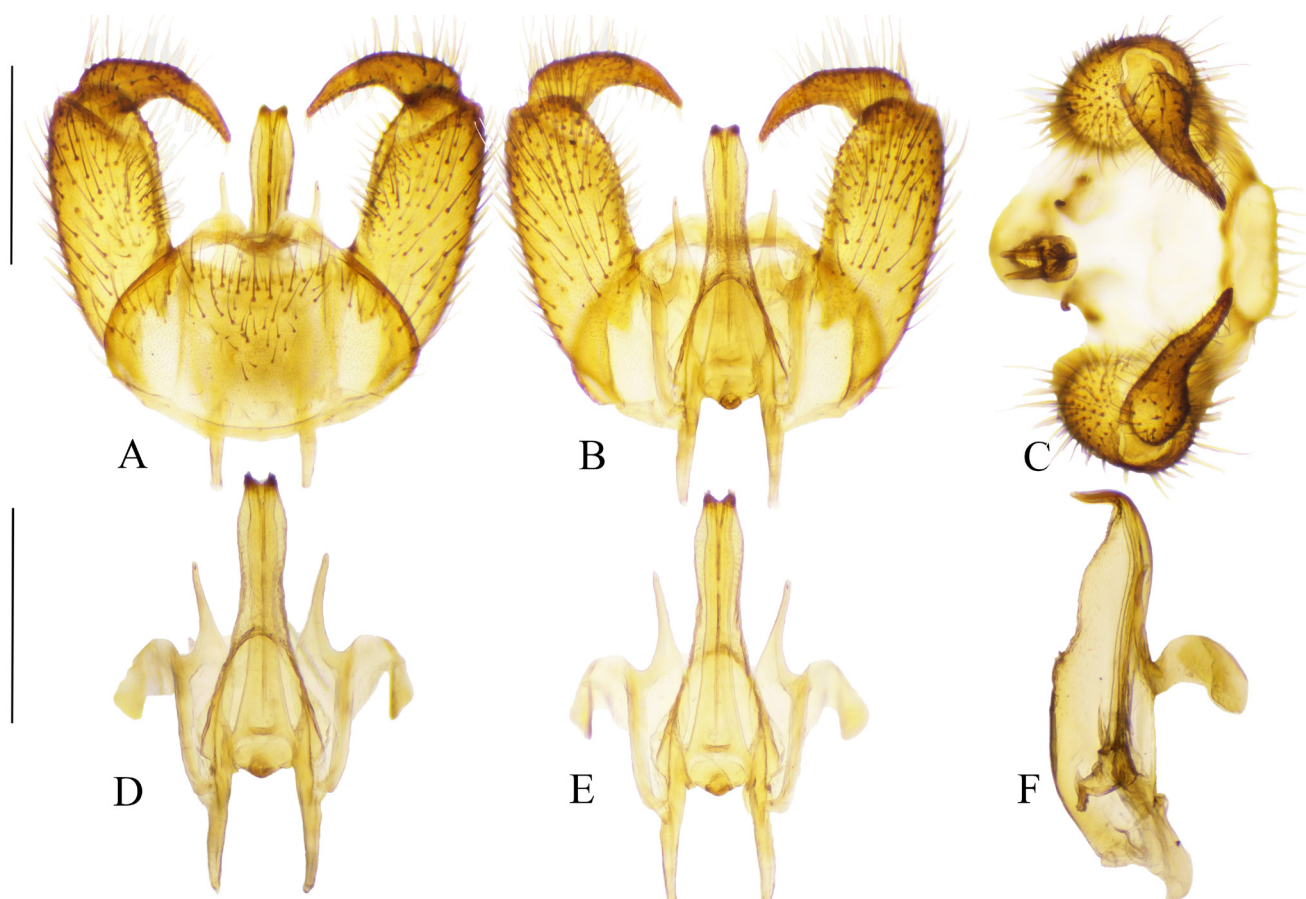


Fig. 9. *Limonia phragmitidis* (SCHRANK, 1781): A–C male hypopygium, A – dorsal view, B – ventral view, C – caudal view; D–F aedeagal complex, D – dorsal view, E – ventral view, F – lateral view. scale bars: 0.5 mm

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Table 1. Collection data in Austria (AT), Bosnia and Herzegovina (BA), Bulgaria (BG), Greece (GR), Montenegro (ME), Republic of Macedonia (MK), Romania (RO), Serbia (RS), and Turkey (TR).

| Species                                    | Male(s) | Female(s) | Date        | Location   | Lat. (°N) | Long. (°E) | Collector(s)                             |
|--|---------|-----------|-------------|--|-----------|------------|--|
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 0         | 13-May-2000 | RO, Valcele, 660 m                                       | 46.689113 | 23.614652  | Keresztes L.                             |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 0         | 10-Jun-2006 | RO, Siscani, 95 m  | 46.162894 | 27.172052  | Keresztes L.                             |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 0         | 21-Apr-2010 | RO, Cluj-Napoca, Alexandru Borza botanical garden, 395 m | 46.760983 | 23.586981  | Kolcsár L.-P.                            |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 0         | 1-May-2011  | BG, Malko Tamovo, Sinemorets Ropotamo, 310 m             | 41.972151 | 27.483868  | Kolcsár L.-P.                            |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 5       | 0         | 1-May-2011  | BG, Tsarevo, Black sea, Sinemorets Ropotamo, 7 m         | 42.166242 | 27.850944  | Kolcsár L.-P.                            |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 8       | 0         | 8-May-2011  | RO, Bujoreni, Cozia mts., Olt, 800 m                     | 45.30215  | 24.310798  | Kolcsár L.-P.                            |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 8       | 1         | 30-Apr-2012 | BG, Dabravaka, Dabravaka lake, 350 m                     | 43.65536  | 22.628277  | Kolcsár L.-P., Keresztes L.              |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 2         | 4-May-2012  | MK, Bratin Dol, Pelister mts., brook, 875 m              | 41.069441 | 21.234352  | Kolcsár L.-P.                            |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 2       | 0         | 5-May-2012  | MK, Vevcani, Jablanica mts., Jabalanica NP, 1407 m       | 41.249144 | 20.562261  | Keresztes L., Török E.,<br>Kolcsár L.-P. |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 0         | 7-May-2012  | RS, Kobisnica, forrest, 250 m                            | 44.209965 | 22.454691  | Kiss R., Kolcsár L.-P.                   |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 5       | 1         | 7-May-2012  | RS, Temska, Cerovo brook, 450 m                          | 43.279814 | 22.525774  | Török E.                                 |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 0         | 6-May-2013  | TR, Yahsihan, lake shore, 978 m                          | 40.423415 | 32.37405   | Török E.                                 |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 0         | 9-May-2013  | BG, Lyubimets, dry bushy, 74 m                           | 41.843234 | 26.124223  | Kolcsár L.-P.                            |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 1       | 1         | 10-May-2013 | RS, Vratarnica, 191 m                                    | 43.769708 | 22.311339  | Török E.                                 |
| <i>Limonia pannonica</i><br>(Kowarz, 1868) | 2       | 1         | 12-May-2013 | RO, Cluj-Napoca, Faget Forest, Garbaului brook, 460 m    | 46.709365 | 23.52946   | Kolcsár L.-P., Török E.,<br>Horváth C.   |



| Species  | Male(s) | Female(s) | Date        | Location  | Lat. (°N) | Long. (°E) | Collector(s)              |
|--|---------|-----------|-------------|---|-----------|------------|---------------------------|
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 1       | 0         | 30-May-2013 | RO, Cluj-Napoca, Faget Forest, Garbaului brook, 400 m | 46.730674 | 23.530337  | Lózer B., Funkenhauzer I. |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 1       | 0         | 21-Apr-2014 | RO, Camarasu, black locust-oak forest, 430 m          | 46.787641 | 24.089566  | Kolcsár L.-P.             |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 1       | 0         | 21-Apr-2014 | RO, Faragau, 397 m                                    | 46.765284 | 24.558452  | Kolcsár L.-P.             |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 2       | 0         | 29-Apr-2014 | RS, Majdan, 480 m                                     | 44.111351 | 20.482158  | Kolcsár L.-P.             |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 1       | 1         | 29-Apr-2017 | RS, Bela Crkva, lakes, 78 m                           | 44.891489 | 21.3861    | Kolcsár L.-P., Török E.   |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 1       | 1         | 29-Apr-2017 | RS, Bela Crkva, lakes, 78 m                           | 44.891489 | 21.3861    | Kolcsár L.-P., Török E.   |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 0       | 1         | 30-Apr-2017 | RS, Deliblato, Kraljevaca lakes, 84 m                 | 44.846428 | 21.030658  | Kolcsár L.-P., Török E.   |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 5       | 6         | 30-Apr-2017 | RS, Sumarku, Deliblato Sands, 111 m                   | 44.831943 | 21.111992  | Kolcsár L.-P., Török E.   |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 7       | 5         | 30-Apr-2017 | RS, Deliblato, Deliblato Sands, 137 m                 | 44.864994 | 21.057709  | Kolcsár L.-P., Török E.   |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 0       | 1         | 30-Apr-2017 | RS, Deliblato, Kraljevaca lakes, 84 m                 | 44.846428 | 21.030658  | Kolcsár L.-P., Török E.   |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 5       | 6         | 30-Apr-2017 | RS, Sumarku, Deliblato Sands, 111 m                   | 44.831943 | 21.111992  | Kolcsár L.-P., Török E.   |
| <i>Limonia pannonica</i><br>(Kowarz, 1868)     | 7       | 5         | 30-Apr-2017 | RS, Deliblato, Deliblato Sands, 137 m                 | 44.864994 | 21.057709  | Kolcsár L.-P., Török E.   |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 12-May-2000 | RO, Valcele, 660 m                                    | 46.689113 | 23.614652  | Keresztes L.              |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 11      | 8         | 14-May-2000 | RO, Valcele, 660 m                                    | 46.689113 | 23.614652  | Keresztes L.              |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 3       | 0         | 5-Jun-2001  | RO, Cheia, Trascaului mts., Cheile Turzii, 500 m      | 46.566117 | 23.674705  | Keresztes L.              |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 5       | 1         | 9-Jun-2002  | RO, Zernest, Piatra Craiului, Plaiul Foi hut, 911 m   | 45.562211 | 25.211008  | Keresztes L.              |

| Species  | Male(s) | Female(s) | Date        | Location   | Lat. (°N) | Long. (°E) | Collector(s) |
|--|---------|-----------|-------------|--|-----------|------------|--------------|
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 0         | 13-Jul-2002 | RO, Ciumani, Depresiunea Giurgeu, Mures river, 764 m         | 46.674275 | 25.516251  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 7-Jul-2003  | RO, Suseni, Depresiunea Giurgeu, Mures river, 745 m          | 46.653747 | 25.565715  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 5         | 19-Jun-2004 | RO, Buru, Trascaului mts, Cheile Borzesti, 437 m             | 46.515905 | 23.637386  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 5         | 1-Jun-2005  | RO, Lunca Vita, Macin mts., Fagilor valley, 171 m            | 45.198361 | 28.342211  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 0       | 2         | 7-Jun-2006  | RO, Madarjac, Madarjac forest, 206 m                         | 47.039778 | 27.243089  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 8-Jun-2006  | RO, Brezoi, Cozia mts, Stanisoara monastery, 860 m           | 45.297897 | 24.338587  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 10-Jun-2006 | RO, Lunca Vita, Macin mts., Fagilor valley, 171 m            | 45.198361 | 28.342211  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 21-Jun-2006 | RO, Cluj-Napoca, Mikro-garden, 400 m                         | 46.763511 | 23.58035   | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 2         | 24-Jun-2006 | RO, Praid, Harghita mts, Tamava Mica river, 916 m            | 46.594975 | 25.275308  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 4       | 2         | 28-Jul-2006 | RO, Poiana Marului, Tarcu mts., Bistra Marului valley, 800 m | 45.383776 | 22.577716  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 0         | 3-Jun-2007  | RO, Paltinis, Cindrel mts., Batrana spring, 1720 m           | 45.614661 | 23.885839  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 12-May-2008 | RO, Feleacu, Feleacu plateau, 740 m                          | 46.711844 | 23.592134  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 24-May-2008 | RO, Cluj-Napoca, Mikro-garden, 400 m                         | 46.763511 | 23.58035   | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 3-Jun-2008  | RO, Vlahita, Harghita mts., 845 m                            | 46.325554 | 25.555629  | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 8-Jun-2008  | BG, Belovo, Rhodope mts, 960 m                               | 42.12746  | 23.92926   | Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 4       | 2         | 11-Jun-2008 | BG, Dospat, Rhodope mts., Dospat dam surr, 1412 m            | 41.644979 | 24.125423  | Keresztes L. |

| <b>Species</b>                                 | <b>Male(s)</b> | <b>Female(s)</b> | <b>Date</b> | <b>Location</b>   | <b>Lat. (°N)</b> | <b>Long. (°E)</b> | <b>Collector(s)</b>         |
|--|----------------|------------------|-------------|---|------------------|-------------------|-----------------------------|
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 11-Jun-2008 | BG, Tazhan, Stara Planina mts., Rusalka hut, 1180 m       | 42.692733        | 25.056317         | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 12-Jun-2008 | BG, Tazhan, Stara Planina mts., Rusalka hut, 1180 m       | 42.692733        | 25.056317         | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 4              | 2                | 12-Jun-2008 | BG, Velingrad, Rhodope mts., 870 m                        | 41.976644        | 23.959431         | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 14-Jun-2008 | RO, Baile Herculane, Mehedinti mts., Iauna Mare, 672 m    | 45.069361        | 22.567006         | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 11             | 1                | 17-Jun-2008 | RO, Cluj-Napoca, Faget Forest, Garbaului brook, 460 m     | 46.709365        | 23.52946          | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 6              | 2                | 4-May-2009  | RO, Cluj-Napoca, Miko garden, 373 m                       | 46.763511        | 23.58035          | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 9-May-2009  | RO, Sasca Romana, Semenici mts., Nerei river, 180 m       | 44.901964        | 21.732042         | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 14-May-2009 | RO, Cluj-Napoca, Miko garden, 373 m                       | 46.763511        | 23.58035          | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 3              | 0                | 19-May-2009 | RO, Sacele, Ciucas mts., Doblen, 940 m                    | 45.559139        | 25.911611         | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 9-Jul-2009  | RO, Bretcu, Nemira mts., Oituz, 750 m                     | 46.062367        | 26.366319         | Keresztes L.                |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 0              | 1                | 21-Apr-2010 | RO, Cluj-Napoca, Alexandru Borza botanical garden, 395 m  | 46.760983        | 23.586981         | Kolcsár L.-P.               |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 3                | 9-May-2010  | ME, Rasova, Tara river, bridge, 760 m                     | 43.148398        | 19.292345         | Kolcsár L.-P.               |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2              | 0                | 11-May-2010 | ME, Zabljak, Durmitor mts., Crno Jezero lakeshore, 1440 m | 43.148611        | 19.088203         | Kolcsár L.-P., Keresztes L. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 16             | 3                | 13-May-2010 | ME, Morinj, Kotori bay, Morinj brook, 67 m                | 42.489352        | 18.62896          | Kolcsár L.-P.               |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2              | 1                | 14-May-2010 | ME, Zelenika, Kotori bay, oak forest, 19 m                | 42.453875        | 18.569607         | Kolcsár L.-P.               |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 22-May-2010 | RO, Voslabeni, Depresiunea Giurgeu, Senetea, 764 m        | 46.625875        | 25.597453         | Kolcsár L.-P.               |

| Species  | Male(s) | Female(s) | Date        | Location   | Lat. (°N) | Long. (°E) | Collector(s)  |
|--|---------|-----------|-------------|--|-----------|------------|---------------|
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 22-May-2010 | RO, Hagota, Giurgeu mts., Tisasul valley, 860 m              | 46.861794 | 25.677228  | Kolcsár L.-P. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 23-May-2010 | RO, Subcetate, Harghita mts., Zetea lake, 654 m              | 46.491106 | 25.393439  | Keresztes L.  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 26-May-2010 | RO, Hagota, Giurgeu mts., Tisasul valley, 860 m              | 46.861794 | 25.677228  | Kolcsár L.-P. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 9       | 5         | 4-Jun-2010  | RO, Cluj-Napoca, Mikko garden, 373 m                         | 46.763511 | 23.58035   | Kolcsár L.-P. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 0       | 1         | 16-Jun-2010 | RO, Borsa, Rodnei mts., Cailor waterfall, 1700 m             | 47.588261 | 24.658569  | R. Vaida      |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 10      | 0         | 21-Jun-2010 | RO, Feleacu, Morii valley, 697 m                             | 46.695839 | 23.591183  | Varró A.      |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 3-Jul-2010  | RO, Balan, Hasmas mts., Piatra Singuratica spring, 1410 m    | 46.677567 | 25.827389  | Keresztes L.  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 4         | 9-Jul-2010  | RO, Voslabeni, Depresiunea Giurgeu, Senetea, 764 m           | 46.625875 | 25.597453  | Keresztes L.  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 0         | 10-Jul-2010 | RO, Anies, Rodnei mts., Aniesul Mic, 1220 m                  | 47.537986 | 24.672786  | R. Vaida      |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 29-Jul-2010 | RO, Ditrau, Depresiunea Giurgeu, village, 757 m              | 46.807808 | 25.506822  | Kolcsár L.-P. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 0         | 2-Aug-2010  | RO, Feleacu, Morii valley, 697 m                             | 46.695839 | 23.591183  | Varró A.      |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 6-May-2011  | GR, Xanthi, Nestos river, Nestos river, 48 m                 | 41.09188  | 24.759501  | Kolcsár L.-P. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 10      | 0         | 20-May-2011 | RO, Turulung, Arile Protejate Raul Tur", Turulung vii, 132 m | 47.919395 | 23.14722   | Kolcsár L.-P. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 24-May-2011 | AT, Wien, Lobau, 157 m                                       | 48.183354 | 16.516687  | W. Graf       |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 3       | 0         | 4-Jun-2011  | RO, Hagota, Giurgeu mts., Tisasul valley, 860 m              | 46.861794 | 25.677228  | Kolcsár L.-P. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 8-Jun-2011  | RO, Cluj-Napoca, Faget Forest, Garbaului brook, 460 m        | 46.709365 | 23.52946   | Kolcsár L.-P. |

| <b>Species</b>                                 | <b>Male(s)</b> | <b>Female(s)</b> | <b>Date</b> | <b>Location</b>   | <b>Lat. (°N)</b> | <b>Long. (°E)</b> | <b>Collector(s)</b>                 |
|--|----------------|------------------|-------------|---|------------------|-------------------|-------------------------------------|
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 29-Jun-2011 | RO, Boga, Bihor mts., Boga valley, 900 m                    | 46.600833        | 22.666266         | Kolcsár L.-P., Török E.             |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 2-Jul-2011  | RO, Voslabeni, Depresiunea Giurgeu, Senetea, 764 m          | 46.625875        | 25.597453         | Kolcsár L.-P.                       |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 4              | 3                | 6-Jul-2011  | RO, Voslabeni, Depresiunea Giurgeu, Senetea, 764 m          | 46.625875        | 25.597453         | Keresztes L.                        |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2              | 0                | 25-Jul-2011 | RO, Iara, Iara river, 450 m                                 | 46.551075        | 23.517544         | Török E.                            |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2              | 0                | 10-Jul-2012 | RO, Voslabeni, Depresiunea Giurgeu, village, 836 m          | 46.660069        | 25.638842         | Kolcsár L.-P.                       |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 11-Jul-2012 | RO, Ditrau, Depresiunea Giurgeu, village, 757 m             | 46.807808        | 25.506822         | Kolcsár L.-P.                       |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 4              | 2                | 2-May-2013  | RO, Cluj-Napoca, Faget Forest, Garbaului brook, 565 m       | 46.700677        | 23.529615         | Kolcsár L.-P.                       |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 6              | 0                | 12-May-2013 | RO, Cluj-Napoca, Faget Forest, Garbaului brook, 460 m       | 46.709365        | 23.52946          | Kolcsár L.-P., Török E., Horváth C. |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 39             | 11               | 30-May-2013 | RO, Cluj-Napoca, Faget Forest, Garbaului brook, 460 m       | 46.709365        | 23.52946          | Lózer B., Funkenhauzer I.           |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 7              | 2                | 1-Jun-2013  | BG, Stara Reka, Stara Planina mts., Stara Reka river, 804 m | 42.8563          | 26.197069         | Keresztes L.                        |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 3              | 2                | 5-Jun-2013  | RO, Cluj-Napoca, Taietura Turcului, 400 m                   | 46.775386        | 23.558932         | Lózer B., Funkenhauzer I.           |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 119            | 51               | 14-Jun-2013 | RO, Cluj-Napoca, Faget Forest, Garbaului brook, 460 m       | 46.709365        | 23.52946          | Lózer B., Funkenhauzer I.           |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 8              | 2                | 29-Apr-2017 | RS, Bela Crkva, lakes, 78 m                                 | 44.891489        | 21.3861           | Kolcsár L.-P., Török E.             |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 8              | 2                | 29-Apr-2017 | RS, Bela Crkva, lakes, 78 m                                 | 44.891489        | 21.3861           | Kolcsár L.-P., Török E.             |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1              | 0                | 30-Apr-2017 | RS, Deliblato, Kraljevac lakes, 84 m                        | 44.846428        | 21.030658         | Kolcsár L.-P., Török E.             |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 3              | 2                | 30-Apr-2017 | RS, Sumarku, Deliblato Sands, 111 m                         | 44.831943        | 21.111992         | Kolcsár L.-P., Török E.             |

| Species  | Male(s) | Female(s) | Date        | Location   | Lat. (°N) | Long. (°E) | Collector(s)                             |
|--|---------|-----------|-------------|--|-----------|------------|--|
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 30-Apr-2017 | RS, Deliblato, Kraljevac lakes, 84 m               | 44.846428 | 21.030658  | Kolcsár L.-P., Török E.                  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 3       | 2         | 30-Apr-2017 | RS, Sumarku, Deliblato Sands, 111 m                | 44.831943 | 21.111992  | Kolcsár L.-P., Török E.                  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 0         | 6-May-2017  | BA, Gnjilista, Hutovo Blato NP., 5 m               | 43.065492 | 17.754623  | Kolcsár L.-P., Török E.                  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 2       | 0         | 6-May-2017  | BA, Gnjilista, Hutovo Blato NP., 5 m               | 43.065492 | 17.754623  | Kolcsár L.-P., Török E.                  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 0       | 1         | 7-May-2017  | RS, Sabac, 77 m                                    | 44.762445 | 19.639525  | Kolcsár L.-P., Török E.                  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 0       | 1         | 24-Jun-2017 | RS, Kopaonik, Kopaonik Mts., 1600 m                | 43.2981   | 20.787058  | Kolcsár L.-P., Török E.                  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 1         | 24-Jun-2017 | RS, Kopaonik, Kopaonik Mts., 1556 m                | 43.30997  | 20.765627  | Kolcsár L.-P., Török E.                  |
| <i>Limonia phragmitidis</i><br>(Schrank, 1781) | 1       | 0         | 10-Jul-2017 | RO, Gurghiu, dendrological park, 430 m             | 46.773673 | 24.861017  | Kolcsár L.-P., Török E.                  |
| <i>Limonia splendens</i><br>Kuntze, 1920       | 4       | 1         | 1-May-2011  | BG, Malko Tamovo, Sinemorets Ropotamo, 310 m       | 41.972151 | 27.483868  | Kolcsár L.-P.                            |
| <i>Limonia splendens</i><br>Kuntze, 1920       | 2       | 0         | 4-May-2012  | MK, Bitola, Heraclea, 616 m                        | 41.010715 | 21.3431    | Keresztes L.                             |
| <i>Limonia splendens</i><br>Kuntze, 1920       | 11      | 1         | 4-May-2012  | MK, Nakolec, Prespa lake, shore, 854 m             | 40.86135  | 21.11983   | Keresztes L., Török E.,<br>Kolcsár L.-P. |
| <i>Limonia splendens</i><br>Kuntze, 1920       | 2       | 1         | 5-May-2012  | MK, Vevcani, Jablanica mts., Jabalanica NP, 1407 m | 41.249144 | 20.562261  | Keresztes L., Török E.,<br>Kolcsár L.-P. |
| <i>Limonia splendens</i><br>Kuntze, 1920       | 10      | 2         | 12-May-2012 | MK, Ljubojno, Brajchinaska river, 875 m            | 40.896919 | 21.123072  | Török E.                                 |
| <i>Limonia splendens</i><br>Kuntze, 1920       | 1       | 0         | 1-May-2014  | ME, Morinj, Kotori bay, Morinj brook, 67 m         | 42.489352 | 18.62896   | Kolcsár L.-P.                            |
| <i>Limonia splendens</i><br>Kuntze, 1920       | 1       | 0         | 3-May-2014  | ME, Cetinje, Lovcen NP, Bjelosi, 950 m             | 42.367    | 18.8911    | Kolcsár L.-P.                            |
| <i>Limonia splendens</i><br>Kuntze, 1920       | 1       | 0         | 4-May-2014  | ME, Bukovik, dry Quercus forest, 640 m             | 42.212448 | 18.994408  | Kolcsár L.-P.                            |

| <b>Species</b>                           | <b>Male(s)</b> | <b>Female(s)</b> | <b>Date</b>     | <b>Location</b>                     | <b>Lat. (°N)</b> | <b>Long. (°E)</b> | <b>Collector(s)</b>     |
|--|----------------|------------------|-----------------|-------------------------------------|------------------|-------------------|-------------------------|
| <i>Limonia splendens</i><br>Kuntze, 1920 | 0              | 1                | 24-Jun-<br>2017 | RS, Kopaonik, Kopaonik Mts., 1600 m | 43.2981          | 20.787058         | Kolcsár L.-P., Török E. |
| <i>Limonia splendens</i><br>Kuntze, 1920 | 13             | 1                | 24-Jun-<br>2017 | RS, Kopaonik, Kopaonik Mts., 1744 m | 43.313713        | 20.83731          | Kolcsár L.-P., Török E. |