**FAUNISTIC NOTES ON CLEARWING MOTHS (LEPIDOPTERA: SESIIDAE) IN WESTERN HUNGARY**

Željko PREDOVNIK

Ob železnici 82, 3313 Polzela, Slovenia; e-mail: predovnik1@gmail.com

Abstract – The results of a study of the clearwings of western Hungary during the period 2007–2018 are given. A total of 33 species, or 71.7 % of the total number of species known for Hungary are presented with more than 170 concrete data, which do not represent a novelty in the fauna of this country. However, some finds will contribute to knowledge of the distribution of some of the rare and lesser known species of the local fauna. Data are presented for the following four counties: Vas, Zala, Somogy and Veszprém, with special emphasis on the poorly studied border area with Slovenia.

KEY WORDS: Lepidoptera, Sesiidae, western Hungary, fauna

Izveček – FAVNISTIČNI PODATKI O METULJIH STEKLOKRILCIH (LEPIDOPTERA: SESIIDAE) ZAHODNE MADŽARSKE

Podani so rezultati raziskav steklokrilcev zahodne Madžarske med obdobjem 2007–2018. Z več kot 170 konkretnimi podatki je predstavljeno skupno 33 vrst, ali 71.7 % vseh vrst znanih za Madžarsko, ki ne predstavljajo novosti v favni te dežele. Vendar pa bodo nekatere najdbe prispevale k poznavanju razširjenosti zlasti za lokalno favno redkih ali manj znanih vrst. Podatki so predstavljeni za štiri sledeče županije: Vas (Železna županija), Zala (Zalska županija), Somogy (Somoška županija) in Veszprém, s posebnim poudarkom na slabo raziskanih obmejnih območjih s Slovenijo.

KLJUČNE BESEDE: Lepidoptera, Sesiidae, zahodna Madžarska, favna

Introduction

Forty-six clearwing species have so far been found in Hungary (Fazekas, 2017). Due to its typical Pannonian biogeographical features, the territory of Hungary is the

northwestern limit of distribution for some East Mediterranean, Asiatic and Caspian-Asiatic species. Pannonian steppe grassland approaches from the east to barely 70 km from the northwestern border of Slovenia and extends north up to eastern Austria and the south of Slovakia. Only a few rizophagous clearwing species can therefore be found in the border area with Slovenia (own data), while the north side of Lake Balaton is one of the richest in Europe in terms of the number of rizophagous clearwing species. Comments in connection with some of the faunistically most interesting finds are provided in small print.

Abbreviations: (b.a.): (border area), ♂: male, ♀: female, pher.: pheromone, pher. trap: pheromone trap, RAG: transparent plastic delta trap, UNI: plastic funnel trap, e.l.: ex larvae, e.p.: ex pupae, pher. ast: pheromone astatiformis, pher. boh: pheromone bohémica, pher. for: pheromone formicaeformis, pher. hyl: pheromone hylaeiformis, pher. ins: pheromone insolita, pher. mes: pheromone mesiaeformis, pher. myo: pheromone myopaeformis, pher. old api: pheromone old apiformis (with single compound), pher. spu: pheromone spuleri, pher. tab: pheromone tabaniformis, pher. ves: pheromone vespiformis, pher. 16: pheromone 16.

Materials and methods

The following entomological methods were used to investigate the presence of clearwings in the research area of the four counties. One was the traditional method of searching for characteristic symptoms of their preimaginal stages, such as old exit holes, usually with the remains of cocoons inside the bark and feeding traces of larvae under the bark, or on the twigs or roots of their host plants. The use of synthetic sexual pheromones and pheromone traps is an especially valuable method for faunistic investigations. In the research area, pheromone traps were baited with pheromones of various compositions made by Plant Research International (PRI) in Wageningen, The Netherlands. Each pheromone was fixed singly into sticky delta traps (RAG-Trap). The removable sticky layers were covered with Polliizobutilen insect glue. To a much lesser extent, we also used plastic funnel traps (Uni-Trap) with commercial insecticides. The traps were fixed onto the twigs of young bushes and trees, at the height of the lower vegetation or on tree branches at heights of 1 m to 3 m above the ground. The distance between the traps was from 2–15 m, usually 5–7 m, each with a different type of pheromone being placed at each locality. Specimens trapped in delta traps were soaked in clean gasoline and prepared. The third method was collecting male specimens attracted to free hanging pheromones by netting them and, to a lesser extent, free-flying individuals of both sexes in the larval habitats. Localities in the research area are the edges of forests with rich ground vegetation, overgrown meadows, but mostly ruderal surfaces such as quarries, gravel pits, road and railroad embankments, overpasses, along avenues. Captured specimens were later identified by analysis of their external morphological characteristics. Representative specimens are kept in the private collection of the author. The nomenclature used is according to Laštůvka & Laštůvka (2001) and Pühringer & Kallies (2004).

Results

List of species

Microsphecia brosisformis (Hübner, 1813)

Veszprém megye: Litér, 233 m, 1.7.2013, pher. trap RAG, pher. ves, 2♂.

Note. Species, known from a small number of records for Hungary (Laštůvka, 1990; Fazekas, 2017). It reaches the extreme north-western limit of its area of distribution near Veszprém.

Pennisetia hylaeiformis (Laspeyres, 1801)

Vas megye: Kétyölgy/Verica-Ritkarovci (Szakonyfalvi-patak), 300 m, 9.10.2016, two larvae in *Rubus idaeus* L. **Zala megye:** Lovászi-Völgyifalu/Dolina pri Lendavi (forest, b.a.), 280 m, 20.7.–3.8.2013, pher. trap RAG, pher. hyl, 1♂.

Note. One of the clearwing species with a low number of records in Hungary (Fazekas, 2017).



Fig. 1: Trapped male of *M. brosisformis* (marked with red arrow), and specimens or their remains of *Syn. andrenaeformis* and *Syn. vespiformis* in sticky pheromone trap. Near Veszprém, 1.7.2013.

Sesia apiformis (Clerck, 1759)

Vas megye: Kétvölgy/Verica-Ritkarovci, Ritkaháza, 300 m, 9.10.2016, old cocoon in *Populus tremula* L. Kétvölgy/Verica-Ritkarovci, Mogyorós (b.a.), 332 m, 9.10.2016, old exit holes in *P. tremula*. Szentgotthárd /Monošter, Zsidahegy, 290 m, 9.10.2016, old exit hole in *P. tremula*. Orfalu/Andovci-Farkasfa/ Farkašovci (along the road), 285 m, 9.10.2016, old exit holes in *P. tremula*. Kerkáskápolna, 200 m, 19.4.2008, cocoon in *P. tremula*. Bajánsenye, 240 m, 19.4.2008, old cocoon in *P. tremula*. **Zala megye:** Nemesnép-Kebeleszentmárton/ Kobilje (forest, b.a.), 205 m, 7.4.2008, old cocoon in *P. tremula* L. Velemér, Velemérihegy, 230 m, 7.4.2008, old exit holes in *P. tremula*. Nemesnép-Csesztreg, 190 m, 7.4.2008, old cocoon in *P. tremula*. Baglad, 190 m, 7.4. 2008, old cocoon in *P. tremula*. Szentgyörgyvölgy-Szentlászló/Motvarjevci, Voglerovo (b.a.), 205 m, 16.3. 2008, old exit holes in *P. tremula*. Szentgyörgyvölgy-Felsőszenterszébet, 195 m, 7.4.2008, old cocoon in *P. tremula*. Inke-Vése, 135 m, 10.5.2009, old cocoon in *P. tremula*. Nemesved-Szőcsénypusztá, 200 m, 10.5.2009, old exit holes in *P. tremula*. Sormás, 200 m, 19.5.2012, old exit holes in *Populus nigra* L. Zalalövő, Borostyán-tó, 200 m, 31.1.2018, old cocoon in *P. tremula*.

Eusphacia melanocephala (Dalman, 1816)

Vas megye: Kétvölgy/Verica-Ritkarovci, Ritkaháza, 300 m, 9.10.2016, old exit holes. Kétvölgy/Verica-Ritkarovci, Mogyorós (b.a.), 332 m, old exit holes. Dávidháza, 240 m, 31.5.2009, old exit holes. Bajánsenye (along the road to Őriszentpéter), 240 m, 19.4.2008, old exit holes. Bajánsenye, 240 m, 19.4. 2008, larvae pits. Bajánsenye-Őriszentpéter, 256 m, 19.4.2008, larvae pits. Kerkáskápolna, 200 m, 19.4.2008, larvae pit. Velemér, Velemérihegy, 230 m, 7.4.2008, old exit hole. **Zala megye:** Nemesnép-Kebeleszentmárton/Kobilje (b.a.), 205 m, 7.4.2008, more larvae pits. Kebeleszentmárton/Kobilje, Čerteg (b.a.), 202 m, 16.3.2008, old exit hole. Magyarföld, 200 m, 19.4.2008, old larvae pits. Orfalu/Andovci-Farkasfa/ Farkašovci (along the road), 285 m, 9.10.2016, old exit holes. Baglad, 190 m, 7.4.2008, old exit holes. Szentgyörgyvölgy-Felsőszenterszébet, 195 m, 7.4.2008, larvae. Tornyiszentmiklós-Pince, Andovec (b.a.), 187 m, 6.7.2013, old exit holes. Szentgyörgyvölgy-Szentlászló/Motvarjevci, Voglerovo (b.a.), 205 m, 16.3.2008, old exit holes. Nemesnép-Csesztreg, 190 m, 7.4. 2008, larvae pit. Inke-Vése, 135 m, 10.5.2009, old exit hole. Nemesvid-Zöcsénypusztá, 185 m, 10.5.2009, old larvae pits. Ramocsa, 200 m, 31.1.2018, larvae pits. Csöde, 200 m, 31.1.2018, larvae pits. Zalalövő, Borostyán-tó, 200 m, 31.1.2018, old larvae pit. Zalalövő, Nagyfernekág, 240 m, 31.1.2018, old and fresh larvae pits. **Somogy megye:** Szulok, 127 m, 24.3.2006, old exit hole.

Note. According to Fazekas (2017), a rare species with an insufficiently known prevalence in Hungary. However, research in the western regions has shown its high frequency, especially on the border with Slovenia. Typical oval exit holes and often bird damaged larvae pits have been found on the basal parts of dry twigs of aspen (*Populus tremula* L.).

Paranthrene tabaniformis (Rottemburg, 1775)

Vas megye: Dávidháza, 226 m, 30.6.–10.7.2009, pher. trap RAG, pher. tab, 7♂.
Zala megye: Tornyiszentmiklós-Pince, Andovec (b.a.), 180 m, 6.–13.7.2013, pher. trap RAG, pher. tab, 2♂. Hernyék-Murmor, 200 m, 9.–24.8. 2009, pher. trap RAG, pher. boh, 1♂. Bak, 200 m, 9.–24.8.2009, pher. trap RAG, pher. boh, 2♂. **Veszprém megye:** Hidegkút, 300 m, 9.–24.8. 2009, pher. trap RAG, pher. tab, 1♂. Tótvázsony, 310 m, 9.–24.8. 2009, pher. trap RAG, pher. boh, 1♂. Litér, 215 m, 9.–24.8.2009, pher. trap RAG, pher. boh, 1♂. Márkó, 220 m, 21.6.2013, pher. tab, 15.30–16.56 h, 4♂; 21.6.–1.7.2013, pher. trap RAG, pher. tab, 6♂. Veszprém/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, fer. tab, 3♂.

Paranthrene insolita Le Cerf, 1914

Zala megye: Balatongyörök, 215 m, 30.5.2015, pher. ins, 15.48–16.15 h, 2♂.

Note. An interesting species. Adults mostly live high in tree tops and are hard to see in nature. Despite a well-developed proboscis, they have never been seen on flowers on bushes at ground level, unlike other tree-living clearwing species with a well-developed proboscis. Larvae make very short pits in thinner branches and are extremely difficult to find. *P. insolita* was therefore very rare in old museum collections, until the age of pheromones, when it has proved to be most common in oak areas in many countries. Very probably also more frequent in oak sites in Hungary.

Synanthedon scoliaeformis (Borkhausen, 1789)

Zala megye: Zalalövő, Zalalövői Park, 193 m, 31.1.2018, old cocoon in *Betula* sp. **Vas megye:** Örbajánháza, 205 m, 17.5.2009, old cocoon in *B. pendula* Roth.; 31.5.2009, two old exit holes on *B. pubescens* Ehrh. Kétvölgy/Verica-Ritkarovci (Szakonyfalvi-patak), 300 m, 9.10.2016, more exit holes in *B. pendula* Roth.

Note. This recently discovered species in Hungarian fauna is so far known only in the counties in the border area with Slovenia (Predovnik, 2008; Fazekas, 2008, 2017).

Synanthedon spheciformis (Denis & Schiffermüller, 1775)

Vas megye: Kétvölgy/Verica-Ritkarovci, Ritkaháza, 300 m, 9.10.2016, larvae in *Alnus glutinosa* (L). Felsőszőlők/Gornji Senik (b.a.), 310 m, 9.10.2016, larvae in *A. glutinosa*. Pankaz, 195 m, larvae in *A. glutinosa*. **Zala megye:** Tornyiszentmiklós, Ujfaluhegy/Andovec (b.a.), 180 m, 13.7.2013, larvae in *A. glutinosa*. Inke-Vése, 135 m, 10.5.2009, death larvae in *A. glutinosa*. Nemesnép-Csesztreg, 190 m, 7.4.2008, old larvae pit, full of red ants in *A. glutinosa*.

Synanthedon stomoxiformis (Hübner, 1790)

Zala megye: Tornyiszentmiklós-Pince, Andovec (b.a.), 187 m, 6.1–3.7.2013, pher. trap RAG, pher. myo, 5♂. Tornyiszentmiklós-Pince, Andovec (b.a.), 180 m, 6.–13.7.2013, pher. trap RAG, pher. myo, 1♂. Tornyiszentmiklós-Pince, Andovec (SE slope, b.a.), 206 m, 6.–13.7.2013, pher. trap RAG, pher. myo, 3♂. **Veszprém**

megye: Márkó, 220 m, 21.6.2013, pher. myo, 12.15–17.30 h, 6♂. Litér, 233 m, 21.6.–1.7.2013, pher. trap RAG, pher. myo, 32♂. Veszprém/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, pher. myo, 12♂ and into the next pher. trap RAG, fer. myo, 14♂.

Synanthedon culiciformis (Linnaeus, 1758)

Vas megye: Orfalu/Andovci, Agyagos, 265 m, 9.10.2016, old larvae in the *Betula* sp. stump, ex.l. 25.2.2017, 1♀. Orfalu/Andovci, Hosszú-föld, 320 m, 9.10.2016, old exit holes in the *Betula* sp. stump.

Synanthedon formicaeformis (Esper, 1783)

Vas megye: Apátistvánfalva/Števanovci, 260 m, 9.10.2016, larvae in *Salix caprea* L. Dávidháza, 226 m, 30.6.–10.7.2009, pher. trap UNI, pher. for, 21♂. Pankaz, 195 m, larvae in *S. viminalis* L.

Synanthedon flaviventris (Staudinger, 1883)

Zala megye: Felsőjánosfa-Zalamindszent, 195 m, 31.1.2018, typical old larval swelling on *Salix caprea* L. **Vas megye:** Dávidháza, 226 m, 30.6.–10.7.2009, pher. trap RAG, pher. fla, 5♂.

Note. One of the clearwing species with only a few records in Hungary (Fazekas, 2017).

Synanthedon andrenaeformis (Laspeyres, 1801)

Vas megye: Dávidháza, 226 m, 30.6.–10.7.2009, pher. trap RAG, pher. ves, 13♂; 30.6.–10.7. 2009, pher. trap UNI, pher. for. 4♂. **Zala megye:** Tornyiszentmiklós-Pince, Andovec (b.a.), 187 m, 6.–13.7.2013, pher. trap RAG, pher. ves, 5♂. Tornyiszentmiklós-Pince, Andovec (b.a.), 180 m, 6.–13.7. 2013, pher. trap RAG, pher. ves, 6♂. Tornyiszentmiklós-Pince, Andovec (SE slope, b.a.), 206 m, 6.–13.7.2013, pher. trap RAG, pher. pher. ves, 14♂. Nemesnép-Kebeleszentmárton/Kobilje (b.a.), 205 m, 7.4.2008, two larval swellings, one opened by birds in *Viburnum opulus* L. **Veszprém megye:** Márkó, 220 m, 21.6.2013, pher., 11 h, 1♂. Litér, 233 m, 21.6.2013, pher. ves, 9.47 h, 1♂; 21.6.–1.7.2013, pher. trap RAG, pher. ves, 8♂. Veszprém/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, pher. ves, 8♂, pher. trap RAG, pher. ves, 2♂.

Synanthedon melliniformis (Laspeyres, 1801)

Zala megye: Sormás, 200 m, 19.5.2012, old cocoons, two larvae in *Populus nigra* L.

Note. Known only from a few records (Fazekas, 2017), but probably more common in areas with poplars.

Synanthedon myopaeformis (Borkhausen, 1789)

Vas megye: Kétvölgy/Verica-Ritkarovci, Ritkaháza, 300 m, 9.10.2016, cocoon in *Malus* sp. **Zala megye:** Tornyiszentmiklós-Pince, Andovec (b.a.), 180 m, 6.–

13.7.2013, pher. trap RAG, pher. ins, 1♂. Tornyiszentmiklós-Pince, Andovec (SE slope, b.a.), 206 m, 6.–13.7.2013, pher. trap RAG, pher. myo, 1♂. Bak, 200 m, 9.–24.8.2009, pher. trap RAG, pher. myo, 1♂. Palin, 200 m, 6.–19.5.2012, pher. trap UNI, pher. mes, 1♂. **Veszprém megye:** Litér, 215 m, 9.–24.8.2009, pher. trap RAG, pher. myo, 1♂.

Synanthedon vespiformis (Linnaeus, 1761)

Zala megye: Baglad, 190 m, 7.4.2008, numerous larvae in the stumps of *Quercus* sp. Tornyiszentmiklós-Pince, Andovec (b.a.), 187 m, 6.–13.7.2013, pher. trap RAG, pher. ves, 1♂. Tornyiszentmiklós-Pince, Andovec (b.a.), 180 m, 6.–13.7.2013, pher. trap RAG, pher. ves, 2♂. Tornyiszentmiklós-Pince, Andovec (SE slope, b.a.), 206 m, 6.–13.7.2013, pher. trap RAG, pher. ves, 11♂. **Veszprém megye:** Vöröstó-Barnag, 310, 9.–24.8.2009, pher. trap RAG, pher. ves, 41♂. Litér, 233 m, 21.6.–1.7. 2013, pher. trap RAG, pher. ves, 17♂. Tótvázsony, 310 m, 9.–24. 8.2009, pher. trap UNI, pher. ves, 147♂. Hidegkút, 300 m, 9.–24.8.2009, pher. trap RAG, pher. ves, 82♂. Márkó, 220 m, 1.7.2013, pher. ves, 17.04 h, 1♂. Veszprém/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, pher. ves, 2♂.

Synanthedon conopiformis (Esper, 1782)

Vas megye: Dávidháza, 226 m, 30.6.–10.7.2009, pher. trap RAG, pher. tab, 1♂. **Zala megye:** Nemesnép-Csesztreg, 190 m, 7.4.2008, larvae in *Quercus* sp.

Synanthedon tipuliformis (Clerck, 1759)

Vas megye: Kétvölgy/Verica-Ritkarovci, Ritkaháza, 300 m, 9.10.2016, larvae pit. Felsőkotormány, Kotormányhegy, 224 m, 31.5.2009, larvae. Szentgotthárd/Monošter, Zsidahegy, 290 m, 9.10.2016, larvae. Bajánsenye (village), 240 m, 19.4.2008, larvae pit. Örbajánháza, 215 m, 31.5.2009, larvae, ex.l. 14.6., 1♀ and 16.6.2009, 1♀, ex. *Euonymus europaea*. Velemér, 195 m, 7.4.2008, larvae. Velemér, Velemérihegy, 230 m, 7.4.2008, larvae. **Zala megye:** Nemesnép, 180 m, 7.4.2008, dead larvae. Nemesnép-Baglad, 190 m, 7.4.2008, larvae pits. Nemesnép-Csesztreg, 190 m, 7.4.2008, larvae. Tornyiszentmiklós-Pince, Andovec (SE slope), 206 m, 6.–13.7. 2013, pher. trap RAG, pher. tip, 2♂. Zalalövő, Borostyán-tó, 200 m, 31.1.2018, larvae.

Note. All larvae and larval pits were found in *Euonymus europaea* L., on which it was easy to find in branches and stems with damaged and dried tops.

Synanthedon loranthei (Králiček, 1966)

Vas megye: Apátistvánfalva/Števanovci, 260 m, 9.10.2016, two larvae in *Viscum album* L. on *Pyrus* sp. **Zala megye:** Csesztreg, Kerkaújfalu, 200 m, 31.1.2018, larvae pits in *V. album* L.

Bembecia ichneumoniformis (Denis & Schiffermüller, 1775)

Vas megye: Kétvölgy/Verica-Ritkarovci, Katalinhegy, 350 m, 9.10.2016, larvae pit in *Lotus* sp. Alsókotormány, 233 m, 31.5.2009, larvae in *Lotus* sp. Pankaz, 195 m, 31. 1. 2018, larvae in *Lotus* sp. **Zala megye:** Tornyiszentmiklós-Pince, Andovec

(b.a.), 180 m, 6.–13.7.2013, pher. trap RAG, pher. old api, 1♂. Tornyiszentmiklós-Pince, Andovec (SE slope, b.a.), 206 m, 6.–13.7.2013, pher. trap RAG, pher. old api, 1♂. **Veszprém megye:** Márkó, 220 m, 21.6. 2013, pher. myo, 11.35–11.47 h, 2♂ and in free flight at 13.47 h, 1♂.

Bembecia scopigera (Scopoli, 1763)

Veszprém megye: Márkó, 220 m, 2.10.2007, old larvae pits, cocoons in the roots of *Onobrychis* sp.

Bembecia uroceriformis (Treitschke, 1834)

Veszprém megye: Hidegkút, 300 m, 9.–24.8.2009, pher. trap RAG, pher. tab, 1♂. Litér, 215 m, 9.–24.8.2009, pher. trap RAG, pher. boh, 1♂.

Note. This generally common species in the Mediterranean area is obviously rare in the Pannonian Plain. It is known in Hungary from a small number of records (Laštůvka, 1990; Fazekas, 2017). In Austria, there are only a few very old and questionable data for the eastern part of the country (Pühlinger, 1997). *B. uroceriformis* is very local and rare in the south and southeast of Slovakia (Bělin, 1999), as well as in the south and east of Serbia (Toševski, 1986, online).

Pyropteron triannuliformis (Freyer, 1843)

Vas: Kétvölgy/Verica-Ritkarovci, Katalinhegy, 350 m, 9.10.2016, larvae in *Rumex* sp. **Zala megye:** Tornyiszentmiklós-Pince, Andovec, 187 m, 6.–13.7.2013, pher. trap RAG, pher. old api, 2♂. Tornyiszentmiklós-Pince, Andovec, 180 m, 6.–13.7.2013, pher. trap RAG, pher. old api, 4♂. Tornyiszentmiklós-Pince, Andovec (SE slope), 206 m, 6.–13.7.2013, pher. trap RAG, pher. old api, 2♂. Felsőjánosfa-Zalamindszent, 195 m, 31.1.2018, larvae in *Rumex* sp. **Veszprém megye:** Veszprem/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, pher. spu, 1♂. Veszprém, Sashegy, 250 m, 14.10. 2006, larvae pits in *Rumex* sp.

Pyropteron affinis (Staudinger, 1856)

Veszprém megye: Márkó, 220 m, 21.6.2013, pher. ves, 16.56 h, 1♂; 1.7.2013, pher., 17 h, 2♂. Veszprém/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, pher. myo, 2♂.

Chamaesphexia annellata (Zeller, 1847)

Veszprém megye: Litér, 215 m, 9.–24.8.2009, pher. trap RAG, pher. boh, 1♂. Királysztentistván, 135 m, 9.8. 2009, the remains of exuvia, numerous larvae pits in *Ballota nigra* L. Veszprém/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, pher. ves, 5♂ and in another trap. RAG, pher. ves, 1♂. Vöröstó-Barnag, 310, 9.8.2009, more larvae pits in *B. nigra*; 9.–24.8.2009, pher. trap RAG, pher. ves, 1♂.

Note. The presence of larvae in attacked *Ballota nigra* L plants can usually be easily detected by the mass of characteristic dirty white chips between the stems and on the roots, produced during their feeding. The species has not yet been found in Slovenia or northwestern Croatia.

Chamaesphecia masariformis (Ochsenheimer, 1808)

Veszprém megye: Márkó, 220 m, 2.10.2007, at least 20 infected shoots, e.l. 26.1.2008, 1♂, 30.1., 1♂, 5.2., 1♀, 7.2., 1♂, 10.2., 1♂, 14.2., 1♂, 21.2., 1♀, 1.3.2008, 1♂. Veszprém, Sashegy, 250 m, 14.10.2006, 15 larvae, e.l. 29.1.2007, 1♂, 7.2., 1♂, 9.2., 1♂, 15.2., 1♀, 23.2., 1♀, 28.2., 1♂, 4.3.2007, 1♂. All ex. *Verbascum* spp.

Note. Generally very rare and local species in the south of Central Europe. For Austria, only a few old data for the east of the country exist and similarly for northern Italy (Pühringer, 1997, Bertaccini & Fiumi, 2002). It has not yet been found in Slovenia and NE Croatia. In the study area, larvae live only in young plants of two-year *Verbascum* species, which usually contain one larva per plant. In only one case were three larvae found in the root of a single plant. In the time of study in the month of October, attacked young plants had not yet begun flowering stems and differed in the vast majority of cases from healthy ones in terms of smaller size and being more or less wilted, occasionally with completely dried (brown) leaves. About 25 % of collected larvae were infected with parasitoid flies (Diptera).

Chamaesphecia bibioniformis (Esper, 1800)

Zala megye: Balatongyörök, 215 m, 30.5.2015, larvae in *Euphorbia seguieriana* N. **Veszprém megye:** Tótvázsony, 310 m, 24.8.2009, larvae in *E. seguieriana*. Márkó, 173 m, 2.10.2007, 33 one and two-year larvae, e.l. 9.3.2008, 1♀, 21.3., 1♀, 25.3., 1♂, 4.4.2008, 1♂, ex. *E. seguieriana*. Márkó, 220 m, 21.6.2013, in free flight at 11.37 h, 1♀; pher. trap RAG, pher. myo, 17.30–18 h, 9♂; pher. myo, 16.14–17.55 h (max. 16.17–16.55 h), 56 ♂; 1.7.2016, pher. ves, 15.20–17.30 h, 12♂. Veszprém/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, pher. myo, 3♂ and in another trap RAG, pher. myo, 2♂. Litér, 233 m, 21.6.–1.7.2013, pher. trap RAG, pher. myo, 3♂.

Note. The prevalence of *Ch. bibioniformis* through the Balkans and in the south of Central Europe depends on the presence of steppes spurge (*E. seguieriana*). Although *E. seguieriana* is also present in some areas of northern Italy (Bertaccini & Fiumi, 2002), it has never been found in Slovenia (Frajman, 2001), where *Ch. bibioniformis* has never been recorded.

Chamaesphecia palustris Kautz, 1927

Somogy megye: Góla-Berzence, 133 m, 10.5.2009, larvae and pupae in *Euphorbia palustris* L., ex.l.-ex.p. 13.5. 1♂, 15.5. 1♂, 17.5. 2♂, 1♀, 20.5. 1♀, 21.5. 1♀, 23.5., 1♂, 28.5., 1♂, 31.5. 1♀, 1♂, 3.6.2009, 2♂.

Note. Together with the host plant of their larvae, *Ch. palustris* is generally one of the most endangered species because of the destruction of its natural wetland habitats.

Chamaesphecia euceraeformis (Ochsenheimer, 1816)

Veszprém megye: Márkó, 220 m, 21.6.2013, pher. myo, 11.35–11.47 h, 1♂; 1.7.2014, pher. myo, 11.36 h, 1♂.



Fig. 2: Trapped male of *Ch. leucopsiformis* (marked with red arrow) and *Syn. myopaeformis* in sticky RAG pheromone trap. Near Veszprém, 24.8.2009.

Chamaesphecia leucopsiformis (Esper, 1800)

Veszprém megye: Litér, 215 m, 9.–24.8.2009, pher. trap RAG, pher. myo, 1♂.

Chamaesphecia empiformis (Esper, 1783)

Vas megye: Kétyölgy/Verica-Ritkarovci, Ritkaháza, 300 m, 9.10.2016, old larvae pit. Apátistvánfalva/Števanovci, 260 m, 9.10.2016, larvae. Orfalu/Andovci, Hosszúföld, 320 m, 9.10.2016, larvae pit. **Zala megye:** Tornyiszentmiklós-Pince, Andovec (b.a.), 180 m, 6.–13.7.2013, pher. trap RAG, pher. old api, 1♂. Balatongyörök, 215 m, 30.5.2015, pher old api, 15.57 h, 1♂. **Veszprém megye:** Márkó, 220 m, 21.6.2013, pupae; pher. tab and 16, 12.16–17.55 h, 18♂; 21.6.–1.7.2013, pher. trap RAG, pher. ves, 8♂; 21.6.–1.7.2013, pher. trap RAG, pher. 16, 10♂; 1.7.2016, pher. ves, 15.20–17.30 h, 6♂.

Note. Monophagous larvae of *Ch. empiformis* are present in practically any site with *Euphorbia cyparissias* L. In mixed areas with both spurges *E. cyparissias* and *Euphorbia esula* L. growing together, it is almost impossible to determine and

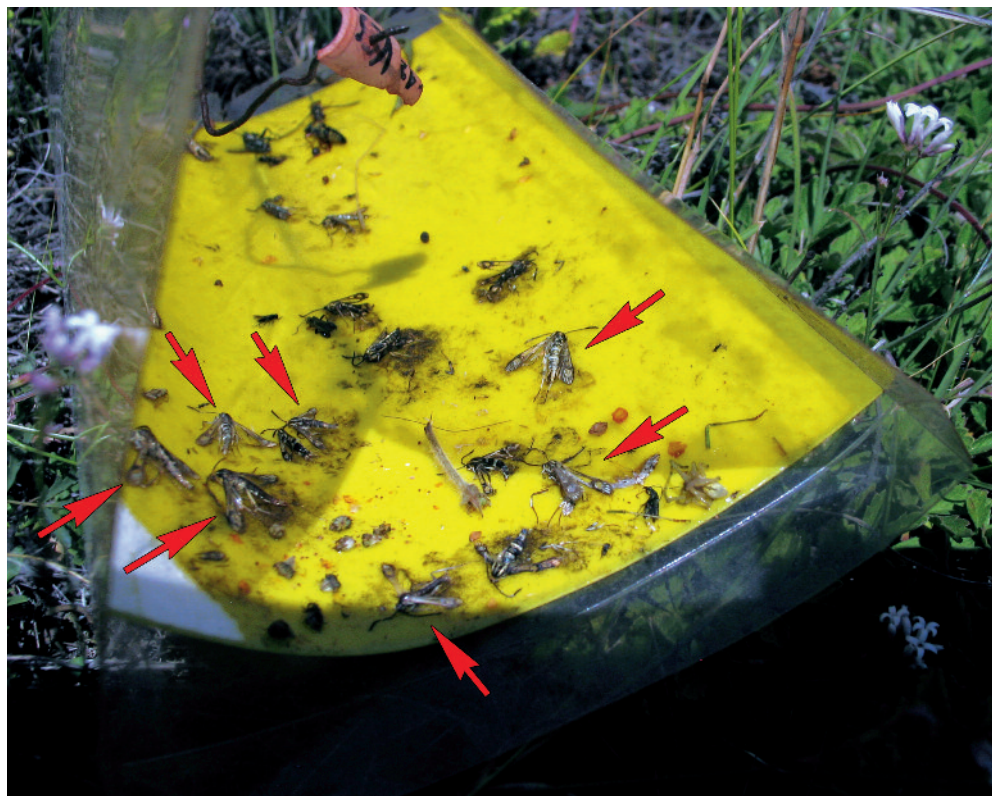


Fig. 3: Trapped male specimens of *Ch. astatiformis* (marked with red arrow), in addition to *Ch. cf. empiformis* and *S. andrenaeformis* in sticky RAG pheromone trap. Near Veszprém, 1.7.2013.

distinguish males of this species from males of the sister species *Ch. tenthrediniformis*, trapped together in the same pheromone traps. According to Pühringer & Ryrholm (2000) and Bąkowski (2013), pheromone myo is well attractive to males of *Ch. tenthrediniformis* and only less attractive to *Ch. empiformis*. The author therefore suggests that most of the males trapped in traps with pheromone myo belong to *Ch. tenthrediniformis*. According to Pühringer (online, 2017) and to some unpublished author's data, pheromones tab, ves and 16 are attractive for *Ch. empiformis*, but not for *Ch. tenthrediniformis*.

Chamaesphecia tenthrediniformis (Denis & Schiffermüller, 1775)

Zala megye: Nagykanizsa/Velika Kaniža, 200 m, 6.5.2012, three larvae, ex.1. 9.6.2012, 1♀, ex. *Euphorbia esula* L. **Veszprém megye:** Márkó, 220 m, 1.7.2014, pher. myo, 16.20–17.30 h, 1♂. Litér, 233 m, 21.6.–1.7.2013, pher. trap RAG, pher. myo, more ♂.

Chamaesphesia astatifomis (Herrich-Schäffer, 1846)

Veszprém megye: Márkó, 220 m, 21.6.–1.7.2013, pher. trap RAG, pher. ves, 12♂. Veszprém/Márkó, 235 m, 21.6.–1.7.2013, pher. trap RAG, pher. ast, 1♂, Litér, 233 m, 21.6.–1.7.2013, pher. trap RAG, pher. ast, 1♂.

Note. This steppe species has become rare in the north-western periphery of its distribution area (Pühringer, 1997).

Discussion

The research method using pheromone traps baited with different pheromones provided an interesting set of clearwing species of trapped males in the investigated area, with valuable faunistic results and is very useful for the detection of many species. Males of the rare species *M. brosisiformis* were caught inside a trap that had been placed very low, lodged on vegetation. Bearing in mind the specific flight of *M. brosisiformis* just above the ground, it seems to be the only effective way of placing traps for this species. In larval habitats of *Ch. masariformis*, no trapped male specimens were found in the pheromone traps in the flying period of this species which may suggest that males of *Ch. masariformis* do not fly into traps baited with the available attractive pheromones, similar to *Ch. doleriformis colpiformis* (Staudinger, 1856), investigated in Slovenia. However, males of both species fly numerously to freely located pheromones. The results of a systematic search of *Pennisetia bohemica* Králíček & Povolný, 1974 in 2008, through the use of appropriate pheromones and traps in sites with large numbers of food plants (*Rosa* spp.), especially in the area of northern Balaton, were also negative. It has already been found in most of the neighboring countries (Predovnik, 2004, 2009; Bartsch, 2003; Pühringer, 2004), so it is an expected species for Hungary. We also had a negative score with pheromone traps in larval habitats of *Bembecia puella* Laštůvka, 1989 in northern Balaton. According to Karalius et al (2000), males of this species do enter pheromone traps. However, taking into account the short, barely one-year period of using traps and poor coverage at certain periods, some of these results and assumptions need to be confirmed and a number of species should be sought in further research.

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