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New records of leafhoppers for Poland (Hemiptera: Cicadomorpha)

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ABSTRACT. The paper presents data on the distribution and biology of five leafhopper species new to the Polish fauna: *Eupteryx lelievrei* (LETHIERRY, 1874), *Zyginidia pullula* (BOHEMAN, 1845), *Zygina schneideri* (GÜNTHART, 1974), *Macrosteles sardus* RIBAUT, 1948 and *Metalimnus steini* (FIEBER, 1869).

KEY WORDS: Hemiptera, Cicadomorpha, leafhoppers, new record, Poland.

INTRODUCTION

Together with planthoppers (Fulgoromorpha), leafhoppers (Cicadomorpha) belong to the herbivorous hemipterans that feed on plant sap and the contents of mesophyll cells. Until the mid-1990s, they were treated as a monophyletic group within Homoptera under the name Auchenorrhyncha. However, molecular studies (CAMPBELL et al. 1995; SORENSEN et al. 1995) together with traditional morphological research (BOURGOIN 1986a, b) revealed that Auchenorrhyncha in fact consist of two separate developmental lineages: Fulgoromorpha and Cicadomorpha. Both groups are now regarded as suborders of Hemiptera, together with Heteroptera and Sternorrhyncha. The term Auchenorrhyncha is still used in the sense of an ecological unit.

Auchenorrhynchans form an important component of the fauna of terrestrial and semi-aquatic ecosystems, with the density of adults in grasslands at times reaching several

hundred individuals per square metre (NICKEL et al. 2002). They nearly all feed on vascular plants, mainly on their stems, leaves and underground parts. Several taxa live on ferns, and there is one record of bryophagy in this group of insects (WHEELER 2003). Some of them are highly specialized feeders, utilizing a certain plant genus or even one single plant species. Phloem sap is their usual food, but some families like Cicadidae, Cercopidae and some Cicadellidae utilize xylem sap instead, and most Typhlocybinae cicadellids feed on the content of mesophyll cells (DOLLING 1991). A number of leafhopper species are vectors of microbes, viruses and phytoplasmas (MLOs), causing serious plant diseases, and are therefore, in some regions of the world, responsible for significant losses in crop production (WEINTRAUB & BEANLAND 2006, WEINTRAUB 2007).

In Europe, 2080 species have been recorded so far, with more than 900 species known from Central Europe (HOCH 2010, HOLZINGER et al. 1997). The Auchenorrhyncha fauna of Poland comprises 543 species (CHUDZICKA 2004 and unpublished data) with 137 taxa recognized as rare and found only in a few places.

Two species of Fulgoromorpha and ten species of Cicadomorpha have been placed on the Red List of Threatened Animals in Poland (DROHOJOWSKA et al. 2002). These are: *Cixius alpestris* WAGNER, 1939, *Calligypona reyi* (FIEBER, 1866), *Cicadetta concinna* (GERMAR, 1821) [= *Cicadetta podolica* (EICHWALD, 1830)], *Peuceptyelus coriaceus* (FALLÉN, 1826), *Aphrophora major* UHLER, 1896, *Aphrophora similis* LETHIERRY, 1888, *Leopallia carpathica* (MELICHAR, 1896), *Sonronius dahlbomi* (ZETTERSTEDT, 1840), *Colladonus torneellus* (ZETTERSTEDT, 1828), *Adarrus bellevoyei* (PUTON, 1877), *Mendrausus pauxillus* (FIEBER, 1869), *Verdanus bensoni* (CHINA, 1933), *Diplocolenus penthopitta* (WALKER, 1851) [= *Diplocolenus sudeticus* (KOLENATI, 1860)] and *Mocuellus quadricornis* DLABOLA, 1949. Only three of these *Cicadetta concinna*, *Aphrophora major* and *Aphrophora similis* were included in the Polish Red Data Book of Animals (GŁOWACIŃSKI & NOWACKI 2004). In addition, *Cicadetta concinna* is protected by law. In terms of nature conservation, not only should the habitats of endangered species be protected but intensive research should also be carried out in the near future to assess their current threatened status.

The present paper provides data on the geographical distribution and biology of five leafhopper species discovered in Poland for the first time.

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MATERIAL AND METHODS

The examined specimens were collected from shrubs or vegetation by sweep-netting, a common way of sampling field layer and arboricolous Auchenorrhyncha (STEWART 2002, NICKEL 2008). The material has been deposited in the collection of the Department of Zoology at the University of Silesia, Katowice.

RESULTS

Eupteryx lelievrei (LETHIERRY, 1874)

Material examined

Krakowsko-Wieluńska Upland: Częstochowa-Dźbów [UTM CB62], *Molinion caeruleae* meadow, 26.06.2008, 1♂, 11.08.2008, 1♂, 26.08.2008, 2♂♂, 9.09.2009, 1♀, M. Walczak leg. et det., meadow with *Holcus lanatus*, 6.08.2007, 1♂, 20.08.2007, 1♂, M. Walczak leg., C. Gębicki det.; Upper Silesia: Oświęcim-Brzezinka [UTM CA64], *Molinio-Arrhenatheretea* meadow, 17.05.2008, 1♀, 8.06.2008, 3♂♂, 1♀, 8.09.2008, 1♂, A. Jedynowicz leg., M. Walczak det. (Fig. 2).

Geographical distribution and biology

This is a European species known from France, Belgium, Germany, Switzerland, Austria, the Czech Republic, Slovakia, Bulgaria and Central Russia (NICKEL 2003, HOCH 2010). It is found rather sporadically, usually collected in low frequencies and low densities from temporarily wet to temporarily dry habitats (forest margins, low-input meadows). The food plant is *Betonica officinalis* (NICKEL 2003).

Zyginidia pullula (BOHEMAN, 1845)

Material examined

Krakowsko-Wieluńska Upland: Częstochowa-Błeszno [CB62], *Molinio-Arrhenatheretea* meadow, 27.05.2005, 1♂, M. Walczak leg., C. Gębicki det.; Częstochowa-Mirów [CB73], bankside vegetation on the River Warta, 5.10.2005, 1♂, M. Walczak leg., C. Gębicki det.; Upper Silesia: Zabrze [CA47], urban lawn, 30.07.2006, 1♂, 1♀, 17.08.2006, 1 ♀, 1.10.2006, 1♂, 2♀♀, A. Mokrzycka leg., M. Walczak det.; Oświęcim-Brzezinka [CA64], abandoned field, 17.07.2008, 1♂, 29.09.2008, 4♂♂, 6.10.2008, 4♂♂, meadow of the alliance *Arrhenatherion elatioris*, 28.08.2008, 1♂, A. Jedynowicz leg., M. Walczak det. (Fig. 1).

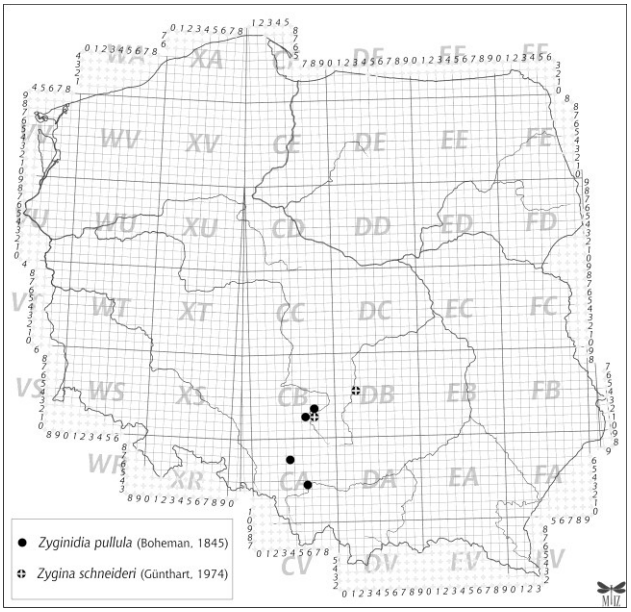

Fig. 1. Distribution of *Zyginidia pullula* (BOH.) and *Zygina schneideri* (GÜNTH.) in Poland.

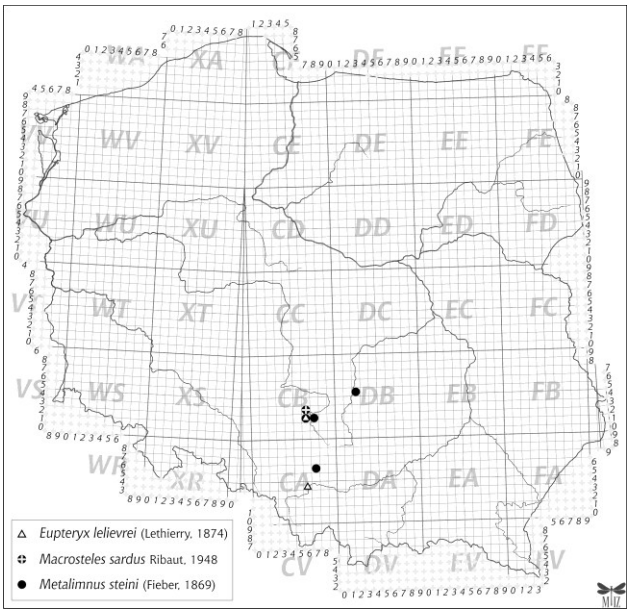

Fig. 2. Distribution of *Eupteryx lelievrei* (LETH.), *Macrosteles sardus* RIB. and *Metalimnus steini* (FIEB.) in Poland.

Geographical distribution and biology

Fifteen species from the genus *Zyginidia* occur in Europe (NAST 1987) but only three of them have been definitely found in Poland: *Zyginidia mocsaryi* (HORVÁTH, 1910), *Zyginidia scutellaris* (HERRICH-SCHAFFER, 1838) and *Zyginidia viaduensis* (WAGNER, 1941) (CHUDZICKA 2004). According to NAST (1976), the fourth one, *Zyginidia pullula*, was erroneously given for the country (Pomerania) by METCALF (1968), and this error was repeated by DWORAKOWSKA (1970). Although reported from neighbouring countries, there has been no confirmed record for Poland as yet.

It is a Western Palaearctic species recorded in many European countries, but, according to NICKEL (2003), some data may refer to *Zyginidia scutellaris*. In Finland (SÖDERMANN 2007), this leafhopper was collected from wooded and dry meadows, giving one generation per year and overwintering in an egg stage, however, in Germany (BIEDERMANN & NIEDRINGHAUS 2004) it is a bivoltine species overwintering as an adult. Host plants are various grasses.

Zygina schneideri (GÜNTHART, 1974)

Material examined

Krakowsko-Wieluńska Upland: Częstochowa – Góra Kamieniołom [CB72], xerothermic grassland (*Festuco-Brometea* class), on *Rosa* sp., 1.10.2005, 3♂♂, 5♀♀, M. Walczak leg., C. Gębicki det., I. Malenovský rev.

A further locality for the species near Dobromierz ("Murawy Dobromierskie" Nature Reserve [UTM DB25]) representing xerothermic shrubs of the *Rhamno-Prunetea* class (*Rosa* sp.) is given in the paper by ŚWIERCZEWSKI & STROIŃSKI (2011) (Fig. 1).

Geographical distribution and biology

The species was discovered and described quite recently in Switzerland (GÜNTHART 1974); since that time it has also been reported from France, Luxembourg, Germany, Austria, Slovenia, Great Britain, Sweden and Norway, which suggests that it is apparently widespread in Europe (NAST 1987, DELLA GIUSTINA & REMANE 2001, HOLZINGER & SELJAK 2001, NICKEL 2003, HOLZINGER 2009, NIEDRINGHAUS et al. 2010a, 2010b). In Germany, it lives on woody species of Rosaceae, preferring rather warm sites such as sunny hillsides with bushes of *Prunus spinosa*, *Rosa canina* and *R. rubiginosa* and urban flower gardens with *Rosa rugosa*, *Potentilla fruticosa*, *Amelanchier* spp. and *Cotoneaster* spp. (NICKEL 2003).

Macrosteles sardus RIBAUT, 1948

Material examined

Krakowsko-Wieluńska Upland: Częstochowa [CB63], *Cirsietum rivularis* meadow,

10.06.2008, 1♂, 26.06.2010, 1♂, *Scirpetum silvatici* meadow, 10.07.2010, 1♂, M. Walczak leg. et det. (Fig. 2).

Geographical distribution and biology

The species was described from Northern Italy (RIBAUT 1948); since that time it has been recorded in Spain, France, Germany, the Czech Republic and Slovakia (HOCH 2010), and more recently in Austria (HOLZINGER 2009) and Luxemburg (NIEDRINGHAUS et al. 2010a, b). Outside Europe it occurs in Kazakhstan (MITYAEV 1971). In Germany, there are a few records from moist, moderately shady sites (all below 200 m above sea level) in river floodplains and along lake shores (NICKEL 2003).

Metalimnus steini (FIEBER, 1869)

Material examined

Upper Silesia: Jaworzno [CA76], urban lawn, 11.09.2008, 1♂, A. Warzecha leg., M. Walczak det.; Krakowsko-Wieluńska Upland: Częstochowa-Góra Kamieniołom [CB72], degraded dry grassland (*Festuco-Brometea* class), 24.08.2007, 1♂, 17.09.2007, 1♂, M. Walczak leg., C. Gębicki det.; Częstochowa-Stradom [CB62], railway embankment vegetation, 29.09.2008, 1♂, 1♀, M. Walczak leg. and det.

A further locality for the species near Dobromierz – Małopolska Upland ("Murawy Dobromierskie" Nature Reserve [UTM DB25]) representing xerothermic grassland (*Thalictro-Salvietum pratensis*) is given in the paper by ŚWIERCZEWSKI & STROIŃSKI (2011) (Fig. 2).

Geographical distribution and biology

According to NICKEL (2003), the taxonomic status of this species is uncertain as the type material is unknown, possibly comprising a complex of species, thus making its actual range difficult to establish. It has been recorded in Germany, Austria, Hungary, Ukraine, Kazakhstan and the Russian Far East (NAST 1987, ANUFRIEV & EMELJANOV 1988, HOLZINGER & REMANE 1994, NICKEL & REMANE 2002). Recently, it has also been recorded in Finland (SÖDERMAN 2007) and the Czech Republic on the basis of material collected within the period from 1961-2009 (MALENOVSKY & LAUTERER 2010). In Germany, this species feeds monophagously on *Carex hirta* in sunny to moderately shady, moderately dry to moderately wet ruderal habitats and meadows (NICKEL 2003).

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