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First record of *Criomorpha williamsi* CHINA, 1939 (Hemiptera: Fulgoromorpha: Delphacidae) in Poland

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ABSTRACT. First record of *Criomorpha williamsi* CHINA, 1939 (Hemiptera: Fulgoromorpha: Delphacidae) in Poland.

The paper presents the information on *Criomorpha williamsi* CHINA, 1939 – a species of Delphacidae family found in Poland for the first time. The single specimen of this species was collected in south-eastern part of country. In Europe this species is quite rare and with scattered distribution, in isolated populations in England, Germany, Czech Republic, Slovakia, Hungary, Norway, Sweden, Finland, Estonia, Latvia, the European part of Russia, also it is distributed in Kazakhstan and Kyrgyzstan. *C. williamsi* is species connected with *Poa* spp. The paper presents data on its biology and diagnostic features.

KEY WORDS: Planthoppers, fauna of Poland, Eastern Beskidy Mountains, new record.

INTRODUCTION

Planthoppers and leafhoppers (Fulgoromorpha EVANS, 1946 and Cicadomorpha EVANS, 1946) belong to a group of phytophagous insects with piercing-sucking mouthparts within the Hemiptera order (GĘBICKI *et al.* 2013). Both units previously thought to be uniform group called Auchenorrhyncha. However, in recent years most authors based both on molecular data and fossil record, consider planthoppers and leafhoppers as two monophyletic taxa, which are separate, although related suborders: Fulgoromorpha and Cicadomorpha (SORENSEN *et al.* 1995, SZWEDO *et al.* 2004). Nevertheless, it should be noted that the study of some scientists still seem to claim close relationship, or even monophyletic origin of the considered groups (YOSHIZAWA & SAIGUSA 2001, SZKLARZEWICZ *et al.* 2007).

For many years Polish scientists conducted an intensive research on planthoppers and leafhoppers fauna, and presented publication is a part of the series of works devoted to the area of the Eastern Beskidy Mts. (TASZAKOWSKI *et al.* 2015a, b). In recent years, those insects were studied both in natural habitats (PILARCZYK *et al.* 2014, ŚWIERCZEWSKI *et al.* 2015), in cities (WALCZAK & MUSIK 2012, WALCZAK *et al.* 2014) or other anthropogenic areas, especially extremely degraded like heaps of coal and zinc (GIBAS 2015, MIELIMONKA 2015, PNIOK 2015).

Since the last publication of planthoppers and leafhoppers check-list, which included 542 species (GĘBICKI *et al.* 2013), the number of known species in the Polish

fauna increased and now it contains 552 positions, with 120 Fulgoromorpha (including *C. williamsi*) and 432 Cicadomorpha representatives. Other species reported since the release of check-list were: *Reptalus quinquecostatus* (DUFOUR, 1833) – TASZAKOWSKI *et al.* 2015a, *Chloriona unicolor* (HERRICH-SCHÄFFER, 1835) – WALCZAK *et al.* 2016, *Idiocerus vicinus* MELICHAR, 1898, *Paralimnus rotundiceps* (LETHIERRY, 1885) – MUSIK *et al.* 2016, *Zygina griseombra* REMANE, 1994 – WALCZAK *et al.* 2014, *Eupteryx decemnotata* REY, 1891 – LUBIARZ & MUSIK 2015, *Orientalis ishidae* (MATSUMURA, 1902) – KLEJDYSZ *et al.* in prep., *Recilia horvathi* (THEN, 1896) – JUNKIERT 2016 and *Calamotettix taeniatus* HORVÁTH, 1911 – WALCZAK & JEZIOROWSKA 2015.

Genus *Criomorpha* CURTIS, 1833 includes 12 known species, wherein the typical species is *Criomorpha albomarginatus* CURTIS, 1833. Some species – *C. albomarginatus* CURTIS, 1833, *C. borealis* (SAHLBERG, 1871), *C. moestus* (BOHEMAN, 1847) and presented here *C. williamsi* occur in the western part of the Palearctic region, mainly in Europe and Russia (NAST 1987, NICKEL 2003). Other like *C. euagropyri* EMELJANOV, 1964 and *C. inequalis* EMELJANOV, 1964 are known from the central Asia (EMELJANOV 1964) while *C. agnus* ANUFRIEV *et al.* AVERKINA, 1982, *C. inconspicuus* (UHLER, 1877), *C. firmatus* EMELJANOV, 1977, *C. niger* DING *et al.* ZANG, 1994, *C. nigerrimus* DLABOLA, 1965 and *C. ovis* ANUFRIEV *et al.* AVERKINA, 1982 inhabit the areas from central Siberia to the Far East. One of the listed species (*C. inconspicuus*) was recorded even in the USA (VAN DUZEE 1916, DLABOLA 1965, ANUFRIEV & AVERKIN 1982, DING & ZHANG 1994, BOURGOIN 2016).

MATERIAL AND METHODS

Collection data

Libusza (near Gorlice), UTM: EA10, geographical coordinates: N: 49°40'48, E: 21°15'33 (Fig. 1.), *Rhamno-Prunetea class* (plant communities of thermophilic coastal scrubs), order *Prunetalia spinosae*, 04.06.2015, 1 ♂, leg. A. Tazsakowski.

Study area

Zoogeographic area (according to *Katalog Fauny Polski*: BURAKOWSKI *et al.* 1973): the Eastern Beskidy Mountains (Beskid Wschodni), in respect of physico-geographical division of Poland by KONDRACKI (2013) this site is situated in the Jasielskie Foothills (Pogórze Jasielskie). Eastern Beskidy Mts., in terms of Fulgoromorpha *et* Cicadomorpha fauna is relatively poorly studied. So far, in this area, only 108 representatives of this group were noted (GĘBICKI *et al.* 2013, MUSIK & TASZAKOWSKI 2013, TASZAKOWSKI *et al.* 2015a, b).



Fig. 1. Location of collection site of *Criomorpha williamsi* CHINA, 1939.

Ryc. 1. Lokalizacja miejsca odłowu *Criomorpha williamsi* CHINA, 1939.

Methods

Specimen was identified with a stereomicroscope, and the external morphological features were used to determine family and genus. Species identification was based mainly on the male genitalia morphology features: pygophore (Fig. 2A), genital styles (Fig. 2C), anal tube, aedeagus (Fig. 2B). We based on the BIEDERMANN & NIEDRINGHAUS (2009) key. Genitalia were carefully dissected and macerated in a 10% potassium hydroxide solution (according to the procedure used in this group) in order to remove soft tissues. This procedure also turns the male genitalia semi-diaphanous, which allows visualizing the shape and all details (KNIGHT 1965).

Species characteristics

Criomorpha williamsi CHINA, 1939 is classified in the family Delphacidae LEACH, 1815, subfamily Delphacinae LEACH, 1815, and Delphacini LEACH, 1815 tribe. In terms of its size and external morphology structure it is similar to other species gathered in the *Criomorpha* genus (BIEDERMANN & NIEDRINGHAUS 2009). However, it stands out from the genus with the structure of male sexual apparatus, especially aedeagus, which in most species is a rod-shaped construction, almost straight with massive spikes. Unlike *C. williamsi* has a short, strongly curved and hooked aedeagus, serrated with a very small spikes with massive basis and strongly tapered ends. Shaft of aedeagus is

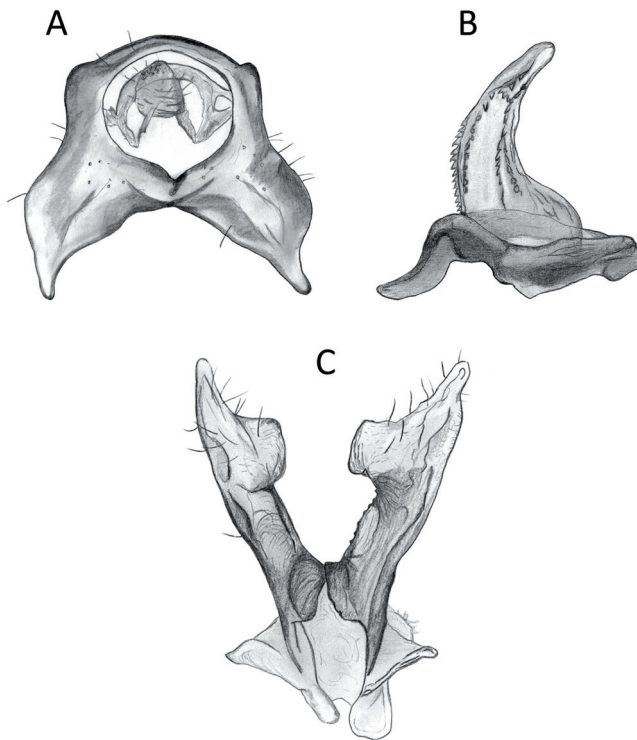


Fig. 2. *Criomorpha williamsi* CHINA, 1939: A – pygophore in posterior view, B – aedeagus with phallobase, C – genital styles (parameres).

Ryc. 2. *Criomorpha williamsi* CHINA, 1939: A – pygofer, widok z tyłu, B – edeagus z fallobazą, C – paramery.

strongly curved, at the base distinctly extended, apically almost sharp (Fig. 2B). While its pygophore, which is widely spaced downward with long and spiky appendages is somewhat similar to the one of *C. firmatus* EMELJANOV, 1977. Appendages of anal tube are long, thickened at the base (Fig. 2A). Genital styles are symmetric (Fig. 2C). Females of Central European species of the genus *Criomorpha* are possible to be distinguished due to the shape of lateral genital lobe, however, there are not clearly visible differences.

Individuals belonging to *C. williamsi* represent forms brachypterous and rarely macropterous (NICKEL 2003, BIEDERMANN & NIEDRINGHAUS 2009). The collected male is a macropterous individual.

In Europe *C. williamsi* is quite rare. Its geographic range include spread, probably isolated, populations in England, Northern Germany, Czech Republic, Slovakia and Hungary (CHINA 1939, LAUTERER 1983, 1992, HOLZINGER *et al.* 2003, OROSZ 2009). Also, it occurs almost in the entire northern Europe – including Norway, Sweden, Finland, Estonia, Latvia and Russia – where it was recorded from the vicinity of Murmansk, St. Petersburg, and areas located to the east of Moscow: Chuvashia, Nizhny Novgorod

and Penza (ANUFRIEV 2002, SÖDERMAN *et al.* 2009). Furthermore, it inhabits Ile Alatau Mountain range in the Tien Shan, Kalbinsky Mountain range in Altai, and West Tien Shan (Ubinsky mountain range) in Kazakhstan, as well as Issykkulski Circuit (Issyk Kul) in the eastern Kyrgyzstan (ANUFRIEV 2002). The holotype of this species comes from England (CHINA 1939). In relation to the Polish borders, the nearest localization where *C. williamsi* was recorded, is situated in South Moravia in the Czech Republic (MALENOVSKÝ & LAUTERER 2010). LAUTERER (1983) claims that the specimens originating from Kazakhstan have been mistakenly identified by MITYAEV (1968), but ANUFRIEV (2002) argues that incorrectly mentioned was only a specimen originating from Ulbinsky Mountain Range in the western part of Altai (NOWICKA *et al.* 2005).

C. williamsi can be found among tall grasses on wet and often slightly eutrophic habitats, like open forest areas, floodplain meadows, along ditches and even on abandoned farmlands. Probably it is 2-degree monophagous (feeding on one genus of plants) (NICKEL & REMANE 2002), associated with *Poa trivialis* and *P. palustris* (NICKEL 2003). Species overwinters in the nymph stage and has one generation per season (NICKEL & REMANE 2002). NICKEL and REMANE (2002) determined chorological element *C. williamsi* as probably Kazakh, but taking into account that many records are known from Scandinavia, Estonia, Latvia, or the northern Russia (SÖDERMAN *et al.* 2009, ANUFRIEV 2002), it seems, it is rather a Euro-siberian species.

In the Czech Republic, due to the rarity, *C. williamsi*, along with 4 other species: *Tettigometra leucophaea* (PREYSSLER, 1792), *Delphax pulchellus* (CURTIS, 1833), *Euides alpina* (WAGNER, 1948) and *Zygina frauenfeldi* LETHIERRY, 1880, it is considered as critically endangered species, and it is placed on the Red List of endangered invertebrates of this country (MALENOVSKÝ & LAUTERER 2012). Its biology is hardly known, evidenced by a small number of caught specimens: only 3 known from Germany (BIEDERMANN & NIEDRINGHAUS 2009); 6 from the Czech Republic (MALENOVSKÝ & LAUTERER 2010) and only a few from Kyrgyzstan (ANUFRIEV 2002).

DISCUSSION

C. williamsi is another interesting planthopper species recorded recently from the area of Poland. Records of new species in Polish fauna are the result of research conducted in various plant communities, both natural (such as wet meadows, moors, xerothermic grasslands, forests) and anthropogenic (ŚWIERCZEWSKI & WOJCIECHOWSKI 2009, PILARCZYK *et al.* 2014, WALCZAK *et al.* 2014, ŚWIERCZEWSKI *et al.* 2015). This indicates the need for further research in various plant communities i.e. in the areas of national parks, landscape and nature reserves, because the knowledge of the structure of planthoppers and leafhoppers communities within these habitats appears still incomplete. Nevertheless, even within cities and other areas subjected to a strong human pressure many rare and interesting species can be found (WALCZAK & MUSIK 2012, WALCZAK *et al.* 2014).

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STRESZCZENIE

Pierwsze stwierdzenie *Criomorpha williamsi* CHINA, 1939 (Hemiptera: Fulgoromorpha, Delphacidae) w Polsce

Jeden osobnik *Criomorpha williamsi* CHINA, 1939 – makropteryczny samiec, został odłowiony w Libuszy k. Gorlic (Beskid Wschodni) w czerwcu 2015 r. Jest to gatunek pierwika nieznanym wcześniej z obszaru Polski.

Criomorpha williamsi CHINA, 1939 to rzadko odnotowywany przedstawiciel rodziny Delphacidae. Gatunek ten znany jest z niewielkiej liczby okazów, chociaż rozpowszechniony jest na dość znacznym areale. Występuje w zachodniej i środkowej części Europy oraz Skandynawii, a ponadto w europejskiej części Rosji, Kazachstanie i Kirgistanie. Najczęściej spotykany jest na wilgotnych łąkach z wysokimi trawami, wzdłuż rowów, a nawet na terenach opuszczonych pól uprawnych i świetlistych lasów. Jest prawdopodobnie troficznie związany z dwoma blisko spokrewnionymi gatunkami traw: wiechliną błotną *Poa palustris* i wiechliną zwyczajną *P. trivialis*. Zimuje w stadium nimfy i ma jedną generację w sezonie.

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