

Japananus hyalinus (OSBORN, 1900) – a new leafhopper
for Polish fauna (Hemiptera: Cicadomorpha)

Japananus hyalinus (OSBORN, 1900) – nowy gatunek piewika
w polskiej faunie (Hemiptera: Cicadomorpha)

Marcin WALCZAK¹, Krzysztof MUSIK¹, Anna MOKRZYCKA²

¹Department of Zoology, Faculty of Biology and Environmental Protection,
University of Silesia, ul. Bankowa 9, PL 40-007 Katowice;
e-mail: marcin.walczak@us.edu.pl, krzysztof.musik@us.edu.pl

²ul. Łanowa 12/13, 41-800 Zabrze; e-mail: annamok@poczta.fm

ABSTRACT: One male specimen of *Japananus hyalinus* (OSBORN, 1900) was found in Zabrze city park, Upper Silesia (UTM: CA47). It is the first record of this species in Poland. This species has been rapidly spreading in Europe and other parts of the world in the last 50 years, colonising new territories. Together with *Graphocephala fennahi* YOUNG and *Stictocephala bisonia* KOPP et YONKE it belongs to the group of three alien leafhoppers in Poland.

KEY WORDS: Hemiptera, Cicadellidae, Deltocephalinae, Scaphytopiini, *Japananus hyalinus*, alien species, Poland.

Introduction

Deltocephalinae is the biggest subfamily of Cicadellidae, represented in the world's fauna by approximately 6,200 species, classified in 850 genera (KHATRI, RUSTAMANI 2011) belonging to 36 tribes (ZAHNISER, DIETRICH 2010). One of Deltocephalinae tribes is Scaphytopiini OMAN, 1943, which is represented by over 20 genera with approximately 250 species, out of which more than 70 have been described in the last thirty years (DELONG, LINNA-

VUORI 1978; LINNAVUORI 1978; VIRAKTAMATH, ANATHA MURTHY 1999; ZANOL 2000, 2006; VIRAKTAMATH 2004; DAI et al. 2006; XING et al. 2008, 2009, 2010; DUAN, ZHANG 2010).

The majority of Scaphytopiini are known from Neotropic and Nearctic regions (OMAN 1949; METCALF 1967; MUSGRAVE 1979; ZANOL 2006), only about 50 species classified in several genera occur in the Old World, mainly in Southeastern Asia and Africa (METCALF 1967; NAST 1972; LINNAVUORI 1978; WEBB 1993; VIRAKTAMATH, ANATHA MURTHY 1999; VIRAKTAMATH 2004; DAI et al. 2006; XING et al. 2008, 2009, 2010; DUAN, ZHANG 2010; KHATRI, RUSTAMANI 2011).

Only two species of Scaphytopiini occur in Europe: *Stymphalus rubrolineatus* (STÄL, 1855) and *J. hyalinus* (NAST 1987). The only representative of the mentioned tribe known in Polish fauna is *J. hyalinus*, recently found in Poland in Zabrze city (MOKRZYCKA 2007).

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Taxonomy, distribution and biology

of *Japananus hyalinus* (OSBORN, 1900)

The genus *Japananus*, among other genera, was excluded from *Platymetopius* BURMEISTER, 1838 by BALL (1931). It is represented in the world fauna by 6 described species, out of which 5 occur in Eastern Asia and only *J. hyalinus* spreads into Europe and other parts of the world.

Four species of the genus *Japananus* have been recently described from Southeastern Asia: *Japananus nepalicus* VIRAKTAMATH et ANATHA MURTHY, 1999 from Nepal (VIRAKTAMATH, ANATHA MURTHY 1999) and *Japananus bicurvatus* XING, DAI et LI, 2008, *Japananus meilingensis* XING, DAI et LI, 2010 and *Japananus lamellosus* XING, DAI et LI, 2010 from China (XING et al. 2008, 2010). *Japananus aceri* (MATSUMURA, 1914) is known from Japan (Hokkaido, Honshu & Kyushu), coastal regions of eastern Russia, Korea and China (NAST 1972; XING et al. 2008) and *J. hyalinus* is known from Japan, China, India, Korea, Australia, New Zealand, Columbia and USA (XING, DAI, LI 2008). Data indicates that in the last 50 years *J. hyalinus* has been rapidly spreading and inhabiting new territories in Europe (ARZONE et al. 1987; SELJAK 2002; NICKEL 2003).

For the first time in Europe, this species was recorded in Austria and Romania (WAGNER, FRANZ 1961; NAST 1972), followed by former Czechoslovakia and Yugoslavia (NAST 1987), Germany (HELLER 1987), Bulgaria, Hungary (LAUTERER 1989), France, Spain, Northern Italy (REMANE, FRÖHLICH 1994; DELLA GIUSTINA, REMANE 2001; GĘBICKI, BEDNARCZYK 2003), Slovenia (SELJAK 2002), Serbia, Southern Russia (NICKEL 2003) and recently Luxemburg (NIEDRINGHAUS et al. 2010).

J. hyalinus was introduced to other continents from Eastern Asia, most likely from Japan, from where its host plants originate – *Acer japonicum* THUNB. and *A. palmatum* THUNB., also introduced to Nearctic region (ARZONE et al. 1987) and Europe (NICKEL 2003) as decorative trees.

It seems that afterwards it came to Europe from the Nearctic. On the above mentioned host species of maples, first specimens of *J. hyalinus* were found in the vicinity of Washington DC, the USA, from where it was described as *Platymetopius hyalinus* OSBORN, 1900 (OSBORN 1900; ARZONE et al. 1987). NICKEL (2003) provides information that after the description of the species many authors predicted that *J. hyalinus* may be found also in Europe.

In 1980s *Japananus meridionalis* BONFILS, 1981 was described from France based on males, distinguished by their head shape. Later *J. meridionalis* was recognized by LAUTERER (1984) as a junior synonym of *J. hyalinus*, because the comparison of specimens from former Czechoslovakia and the USA revealed an identical structure of reproductive organs (LAUTERER 1984).

J. hyalinus could be recognised from the other representatives of the genus by strongly developed apex of aedeagal shafts, straight in ventral view, with delicate, sinuate subapical process (Fig. 1, 2) (XING et al. 2010), and the key for all the representatives of the genus is also provided in XING et al. (2010).

J. hyalinus is a 2nd degree monophagous species, trophically associated with *Acer* L. In Europe it feeds mainly on *Acer campestre* L., which seems to be the primary host plant for the European population of *J. hyalinus* (NICKEL 2003). Moreover, investigations of other authors indicate that many specimens of *J. hyalinus* from Europe were collected on other native species of maples, such as *A. pseudoplatanus* L., *A. monspessulanum* L. and *A. platanoides* L. (SELJAK 2002; NICKEL 2003). In Germany this species was collected more frequently in places with high degree of antropopression such as highly urbanized areas (NICKEL 2003).

J. hyalinus hibernates in an egg stage, in Central and Western Europe is an univoltine species, however, in Italy it gives two generations per year. This species has Eurosiberian range (ARZONE et al. 1987; NICKEL, REMANE 2002).

Locality in Poland

– Upper Silesia: Zabrze – Tadeusz Kościuszko Urban Park (UTM: CA47), 12 VI 2006 – 1♂, urban grassland, A. MOKRZYCKA leg. et det., C. GĘBICKI ver.

Specimen in the collection of the Department of Zoology, the University of Silesia in Katowice.



Fig. 1. Ventral view of *Japananus hyalinus* aedeagus from collection of Department of Zoology, University of Silesia

Fot. 1. *Japananus hyalinus* – edeagus, widok od strony brzusznej (kolekcja Katedry Zoologii Uniwersytetu Śląskiego)



Fig. 2. Lateral view of *Japananus hyalinus* aedeagus from the collection of the Department of Zoology, the University of Silesia.

Fot. 2. *Japananus hyalinus* – eedeagus, widok z boku (kolekcja Katedry Zoologii Uniwersytetu Śląskiego)

Discussion

In Europe twelve alien species of planthoppers occur, out of which the following: *Macropsis elaeagni*, *Orientus ishidae*, *Igutettix oculatus* and *J. hyalinus* originate from Eastern Asia, the others, namely *Acanalonia conica* (SAY, 1830), *Prokelisia marginata* (VAN DUZEE, 1897), *Metcalfa pruinosa* (SAY, 1830), *Stictocephala bisonia* KOPP et YONKE, 1977, *Graphocephala fennahi* YOUNG, 1977, *Erythroneura vulnerata* (FITCH, 1851), *Kyboasca maligna* (WALSH, 1862) and *Scaphoideus titanus* (BALL, 1932) from Nearctic re-

gion (MIFSUD et al. 2010). In Poland *J. hyalinus* together with *Stictocephala bisonia* and *Graphocephala fennahi* belong to the group of three alien species (SOIKA, ŁABANOWSKI 2004; ŚWIERCZEWSKI, STROIŃSKI 2011).

Certain concerns are related with alien species in terms of economy, because they can indicate economically relevant losses on the plantations of trees, fruit, decorative shrubs and rural cultivations. Ecological meaning of *J. hyalinus* in Europe seems low. It is yet unknown if it diffuses plant diseases, therefore it is impossible to predict its threat in terms of economy (MIFSUD et al. 2010). *J. hyalinus* has small ecological meaning, but it was placed in a group of species which may pose threat to plant nurseries. It differs *J. hyalinus* from many other alien species, especially: *Stictocephala bisonia*, *Scaphoideus titanus* and *Metcalfa pruinosa*, which are a threat to cultivated plants and in the case of numerous populations can cause serious economic losses (ARZONE et al. 1987). SELJAK (2002) indicates a threat to plant cultivations in Slovenia from alien leafhoppers species and also excludes *J. hyalinus* from that list, which confirms study results obtained by other authors.

In Poland *J. hyalinus* does not pose a serious ecological threat, however, it is necessary to carry out further research, which will help acquire important information on this and all other alien species in our fauna. It will provide many answers to questions like *J. hyalinus* range in Poland, the estimation of its population and probable threat to economy.

STRESZCZENIE

Japananus hyalinus jest jednym z sześciu dotychczas znanych gatunków rodzaju *Japananus* na świecie i jednocześnie jedynym przedstawicielem Scaphytopiini w Polsce, a wraz z *Stymphalus rubrolineatus* drugim reprezentantem tego plemienia w Europie. *J. hyalinus* został introdukowany na inne kontynenty z Azji Wschodniej, najprawdopodobniej z Japonii i obecnie znany jest także z Ameryki Północnej i Południowej oraz Australii. Liczne publikacje wskazują na to, że w ostatnim pięćdziesięcioleciu gatunek ten szybko rozprzestrzenił się w Europie i zajmuje nowe terytoria. *J. hyalinus* jest monofagiem żyjącym na klonach, na obszarze swojego pierwotnego zasięgu związany jest z *Acer japonicum* i *A. palmatum*, natomiast w Europie przystosował się do gatunków: *Acer campestre*, *A. pseudoplatanus*, *A. monspessulanum* i *A. platanoides*.

Autorzy przedstawili analizę danych literaturowych i na tej podstawie omówili sytuację tego gatunku w Europie, uzupełniając je o stanowisko z Polski, potwierdzone okazem ze zbiorów Katedry Zoologii Uniwersytetu Śląskiego. *J. hyalinus* został odłowiony na Górnym Śląsku: Zabrze – Park im. Tadeusza Kościuszki (UTM: CA47), 12 VI 2006 – 1♂, A. MOKRZYCKA leg. et det., C. GĘBICKI ver. Jest to jedyne dotychczas znane stanowisko występowania *J. hyalinus* w Polsce.

J. hyalinus jest jednym z kilkunastu gatunków obcego pochodzenia w Europie, a wraz z *Stictocephala bisonia* i *Graphocephala fennahi*, należy do grupy trzech nie-europejskich gatunków piewików w Polsce. Dane oparte na licznych publikacjach wskazują, że znaczenie

gospodarcze *J. hyalinus* w Europie jest niewielkie, dotychczas nie wiadomo także czy rozprzestrzenia on choroby roślin, dlatego uznaje się go za gatunek o małym znaczeniu gospodarczym. Jednakże z gatunkami obcego pochodzenia zawsze związane są pewne obawy z uwagi na gospodarkę, gdyż wiele z nich powoduje straty o znaczeniu ekonomicznym na plantacjach drzew i krzewów owocowych, roślin ozdobnych oraz uprawnych, dlatego omawiany tu gatunek wymaga stałej i planowej inwentaryzacji jego stanowisk i dalszych badań.

REFERENCES

- ARZONE A., VIDANO C., ALMA A. 1987: Auchenorrhyncha introduced into Europe from the Nearctic region: taxonomic and phytopathological problems. [In:] WILSON M. R. & NAULT L. R. (eds): Proceedings of 2nd International Workshop on Leafhoppers and Planthoppers of Economic Importance, Provo, Utah, USA, 28th July-1st Aug. 1986. CIE, London: 3-17.
- BALL E. D. 1931: Some new North American genera and species in the group formerly called Platymetopius (Rhynhota Homoptera). The Canadian Entomologist, **63**: 216-222.
- DAI W., ZHANG Y. L., VIRAKTAMATH C. A., WEBB M. D. 2006: Two new Asian Scaphytopiini (Hemiptera: Cicadellidae: Deltocephalinae) with description of a new genus. Zootaxa, 1309: 37-44.
- DELONG D. M., LINNAVUORI R. 1978: Studies on Neotropical leafhoppers (Homoptera, Cicadellidae). Insects Systematic and Evolution, **9** (2): 111-123.
- DELLA GIUSTINA W., REMANE R. 2001: Compléments à la faune de France des Auchenorrhyncha: espèces et données additionnelles; modifications à l'ouvrage de NAST (1987) (Homoptera). Bulletin de la Société entomologique de France, **106** (3): 283-302.
- DUAN Y. N., ZHANG Y. L. 2010: Review of Chinese species of genus *Xenovarta* VIRKTMATH (Hemiptera: Cicadellidae: Deltocephalinae: Scaphytopiini) with description of a new species. Zootaxa, 2490: 40-46.
- GEBICKI C., BEDNARCZYK J. 2003: New and little known species of planthoppers (Hemiptera, Cicadellidae) from Italy. Acta entomologica silesiana, Bytom, **9-10**: 27-30.
- HELLER F. 1987: Zwei für Deutschland neue Zikaden *Japananus hyalinus* und *Calamotettix taeniatus* (Homoptera: Cicadellidae). Stuttgarter Beiträge zur Naturkunde, Nr. 401: 1-7.
- KHATRI I., RUSTAMANI M. A. 2011: Key to the Tribes and Genera of Deltocephalinae Leafhoppers (Auchenorrhyncha, Hemiptera, Cicadellidae) of Pakistan. Zookeys, **104**: 67-76.
- LAUTERER P. 1984: New and interesting records of leafhoppers from Czechoslovakia (Homoptera, Auchenorrhyncha) II. Acta Musei Moraviae, **69**: 143-162.
- LAUTERER P. 1989: New synonymy of *Japananus hyalinus* (OSBORN, 1900), and new findings of the species in Hungary and Bulgaria (Homoptera: Cicadellidae). Folia entomologica Hungarica, **50**: 37-40.
- LINNAVUORI R. 1978: Revision of the Ethiopian Cicadellidae (Homoptera) Paraboloponinae and Deltocephalinae: Scaphytopiini and Goniagnathini. Revue de Zoologie et de Botanique Africaines, **92** (2): 457-500.

- METCALF Z. P. 1967: General Catalogue of the Homoptera. Fascicle VI. Cicadelloidea. Part 10 Euscelidae. United States Department of Agriculture, Agricultural Research Service, Washington D. C. III + 2695 pp.
- MIFSUD D., COCQUEMOT C., MÜHLETHALER R., WILSON M., STREITO J. -C. 2010: Other Hemiptera Sternorrhyncha (Aleyrodidae, Phylloxeroidea, and Psylloidea) and Hemiptera Auchenorrhyncha. Chapter 9.4. [In:] ROQUES A et al. (eds): Alien terrestrial arthropods of Europe. *BioRisk*, **4** (1): 511-552.
- MOKRZYCKA A. 2007 [mscr.]: Piewiki (Fulgoromorpha et Cicadomorpha) zieleni miejskiej Zabrze. Praca magisterska. Uniwersytet Śląski, Katowice.
- MUSGRAVE C. A. 1979: *Scaphytopius* in Florida. *Entomology Circular*, 204: 1-3.
- NAST J. 1972: Palaearctic Auchenorrhyncha (Homoptera). An annotated check list. PWN, Warszawa. 550 pp.
- NAST J. 1987: The Auchenorrhyncha (Homoptera) of Europe. *Annales zoologici*, **40** (15): 535-661.
- NICKEL H. 2003: The Leafhoppers and Planthoppers of Germany (Hemiptera, Auchenorrhyncha): Patterns and strategies in a highly diverse group of phytophagous insects, *Series Faunistica*, **28**: 460.
- NICKEL H., REMANE R. 2002: Artenliste der Zikaden Deutschlands, mit Angabe von Nährpflanzen, Nahrungsbreite, Lebenszyklus, Areal und Gefährdung (Hemiptera, Fulgoromorpha et Cicadomorpha). *Beiträge zur Zikadenkunde*, **5**: 27-64.
- NIEDRINGHAUS R., BIEDERMANN R., NICKEL H. 2010: Verbreitungsatlas der Zikaden des Großherzogtums Luxemburg. *Travaux scientifiques du Musée national d'histoire naturelle Luxembourg*, **61**: 1-395.
- OSBORN H. 1900: A neglected *Platymetopius*. *Entomological News*, **11**: 501-502.
- OMAN P. W. 1949: The Nearctic Leafhoppers (Homoptera: Cicadellidae). A generic classification and Check list. *The Entomological Society of Washington*, **3**: 1-253.
- REMANE R., FRÖHLICH W. 1994: Beiträge zur Chorologie einiger Zikaden-Arten (Homoptera Auchenorrhyncha) in der Westpaläarktis. *Marburger Entomologische Publikationen*, **2** (8): 131-188.
- SELJAK G. 2002: Non-European Auchenorrhyncha (Hemiptera) and their geographical distribution in Slovenia. *Acta Entomologica Slovenica*, **10** (1): 97-101.
- SOIKA G., ŁABANOWSKI G. 2004: Leafhoppers (Auchenorrhyncha, Cicadellidae) observed on ornamental trees and shrubs. *Aphids and Other Hemipterous Insects*, **10**: 135-156.
- ŚWIERCZEWSKI D., STROIŃSKI A. 2011: The first record of the Nearctic treehopper *Stictocephala bisonia* in Poland (Hemiptera: Cicadomorpha: Membracidae) with some comments on this potential pest. *Polish Journal of Entomology*, **80**: 13-22.
- VIRAKTAMATH C. A., ANATHA MURTHY H. V. 1999: A revision of the leafhopper tribe Scaphytopiini from India and Nepal (Insecta, Hemiptera, Cicadellidae, Deltocephalinae). *Senckenbergiana Biologica*, **79** (1): 39-55.
- VIRAKTAMATH C. A. 2004: A revision of the *Varta-Stymphalus* generic complex of the leafhopper tribe Scaphytopiini (Hemiptera: Cicadellidae) from the Old World. *Zootaxa*, **713**: 1-47.

- WAGNER W., FRANZ H. 1961: Unterordnung Homoptera, Überfamilie Auchenorrhyncha (Zikaden). Die Nordost-Alpen im Spiegel ihrer Landtierwelt, **2** (7): 1-58.
- WEBB M. D. 1993: Review of the leafhopper tribe Scaphytopiini (Homoptera: Cicadellidae: Deltocephalinae) with a key to genera. Journal of Natural History, **27** (2): 423-427.
- XING J. C., DAI R. H., LI Z. Z. 2008: A taxonomic study on the genus *Japananus* BALL (Hemiptera, Cicadellidae, Deltocephalinae), with description of one new species from China. Zookeys, **3**: 23-28.
- XING J. C., DAI R. H., LI Z. Z. 2009: A taxonomic study on the genus *Viridomarus* DISTANT (Hemiptera, Cicadellidae, Euscelinae). Acta Zootaxonomica Sinica, **3**: 590-595.
- XING J. C., DAI R. H., LI Z. Z. 2010: Two new species of the genus *Japananus* BALL, 1931 (Hemiptera: Cicadellidae: Deltocephalinae). Zootaxa, 2415: 63-68.
- ZAHNISR J. N., DIETRICH C. H. 2010: Phylogeny of the leafhopper subfamily Deltocephalinae (Hemiptera: Cicadellidae) based on molecular and morphological data with a revised family-group classification. Systematic Entomology, **35**: 489-511. doi:10.1111/j.1365-3113.2010.00522.x
- ZANOL K. M. R. 2000: *Scaphytopius* BALL (Homoptera, Cicadellidae, Deltocephalinae) descriptions of eleven new species. Acta Biológica Paranaense, **29** (1/4): 127-151.
- ZANOL K. M. R. 2006: Catalogue of the neotropical (including north of Mexico) Deltocephalinae (Hemiptera, Cicadellidae). Part I-Athysanini and Deltocephalini excluded. Acta Biológica Paranaense, **35** (3-4): 89-161.