



Deep-lying sites of the house-cricket *Acheta domestica* (Linnaeus, 1758) (Orthoptera: Gryllidae) in coal mines in Upper Silesia (Poland)

Przemysław ŻURAWLEW¹ and Tomasz RUTKOWSKI²

¹The Orthoptera of Poland Project, Żbiki 45, 63–304 Czermin, Poland,

ORCID 0000-0001-8043-7883, e-mail: grusleon@gmail.com (corresponding author)

²Natural History Collections, Faculty of Biology, Adam Mickiewicz University, Uniwersytetu Poznańskiego 6, 61-614 Poznań, Poland, ORCID 0000-0002-1565-7473, e-mail: tomasz.rutkowski@amu.edu.pl

Abstract: The report provides information about the occurrence of the house-cricket *Acheta domestica* in 2021 in the area of the hard coal mines "Budryk" (Ornontowice) and "Pniówek" (Pawłowice). The species was recorded at depths of 900, 1050 and 1290 m ("Budryk") and 1050 m beneath the surface ("Pniówek"). The information provided testifies high adaptability of the species and encourages its search in other Polish mines.

Key words: new locality, cosmopolitan species, adaptation

INTRODUCTION

The house-cricket *Acheta domestica* (Linnaeus, 1758) is a cosmopolitan and synanthropic species that has been found in and around human habitation for many centuries. It is assumed that it moved to areas of Europe and North America from dry and semi-desert areas of northern Africa or southwestern Asia (Ghoury 1961, Walker 2014). In Poland, it has been shown in most regions – in cities and rural areas, inhabiting residential houses, buildings of various purposes, underground heating networks, sewage and garbage dumps (Bazyluk & Liana 2000).

OBSERVATION

In 2021, the authors of this report received information from employees of the "Budryk" Hard Coal Mine (KWK) (Ornontowice, UTM: CA36, 50°10'26"N, 18°45'32"E) and KWK "Pniówek" (Pawłowice, UTM: CA33, 49°58'02"N, 18°41'23"E), about insects unknown to them in large numbers, with a characteristic voice underground. In KWK "Budryk" they were recorded at depths of 900, 1050 and 1290 m, and in KWK "Pniówek" at a depth of 1050 m beneath the surface. It turned out that they were house-crickets *A. domestica*, and they were most often found away from the ventilation shafts along the corridors.

One specimen was collected in Ornontowice [CA36], KWK "Budryk", 24 Apr 2021, 1♂ (Fig. 1), leg. T. Rutkowski, det. P. Żurawlew, 1290 m below ground level, deck 405, wall BW5, temperature ca. 25°C, no permanent lighting, numerous wooden elements. It is debatable how crickets got so deep underground, although according to mine workers they could get there along with wood used, for example, to enclose corridors.

KWK "Budryk" is one of the youngest Polish mines, and works on its construction began in 1978. Its mining field covers an area of 35.97 km² and lies in the centre of the Upper Silesian Coal Basin. The exploited deposits are located in the communes of Ornontowice and Gierałtowice and under the towns of Knurów, Czerwionka-Leszczyny and Mikołów. It is currently the deepest coal mine in Poland, and one of the deepest mines in the whole of Europe. KWK "Pniówek" is located in Pawłowice. It was built in the years 1963–1974, and the size of

its mining area is 28.6 km². The deposit of this mine is located in the municipality of Pawłowice and the city of Jastrzębie-Zdrój.



Fig 1. *Acheta domestica*, male, Ormontowice, KWK „Budryk”, Upper Silesia, April 2021 (Photo by Jacek Wendzonka).

DISCUSSION

The detected sites of *A. domestica* in Polish mines seem to be not unique cases in this area because in 2015 this species was also found in the "Darkov" mine in Karviná (Ostrava-Karviná Coal Basin) in the Czech Republic, near the border with Poland at a depth of 770 m below ground level. A large isolated population of this species was detected here, and the age of the population was estimated at 10-15 years. Crickets lived there in constant darkness and in the variable composition of gas in the air (Kaláb 2015, Tuf et al. 2018). The mines "Budryk", "Pniówek" and "Darkov" are located at various points in the Upper Silesian Basin, which stretches over an area of about 6100 km², of which about 1600 km² is located in the Czech Republic, and the rest in Poland (Gabzdyl & Gorol 2008). Future exploration in other mines (both exploited and unexploited) in Poland would probably allow to determine more accurately the number of deep-lying sites of this species.

The high adaptability of *A. domestica* is evidenced by data from recent years from the area of Poland. The occurrence of this species, apart from previously known habitats, was also found in the landfill in the inactive calcium quarry (Lower Silesia) (pers. obs., M. Brodacki), on post-mine heaps (Upper Silesia) (pers. obs., R. Orzechowski, M. Nagler), as well as in piles of manure from cattle and poultry farms among the agricultural landscape (Lower Silesia, Lublin Upland and Wielkopolska-Kujawy Lowland) (pers. obs., R. Cymbała, M. Gałan, K. Ostrowski). These recently known places offer crickets suitable thermal conditions, perhaps even for year-round survival.

ACKNOWLEDGEMENTS

Data on *A. domesticus* from the mines was provided by employees of KWK "Budryk" and KWK "Pniówek", and for help in preparing the note we thank by Michał Brodacki, Robert Cymbała, Michał Gałań, Petr Kočárek, Maciej Nagler, Ryszard Orzechowski, Krzysztof Ostrowski and Jacek Wendzonka.

REFERENCES

- BAZYLUK W. & LIANA A. 2000. Katalog Fauny Polski. Prostoskrzydłe Orthoptera [Catalogue of Polish Fauna. Orthoptera]. Muzeum i Instytut Zoologii PAN, Warszawa, 158 pp. [in Polish].
- GABZDYŁ W. & GOROL M. 2008. Geologia i bogactwa mineralne Górnego Śląska i obszarów przyległych [Geology and mineral wealth of Upper Silesia and adjacent areas]. Wydawnictwo Politechniki Śląskiej, Gliwice, 175 pp. [in Polish].
- GHOURI A. S. K. 1961. Home and distribution of the house cricket *Acheta domesticus* L. Nature 192: 1000. <https://doi.org/10.1038/1921000a0>
- KALÁB O. 2015. Surprising life in depth of black coal mine! Available at: <https://prg.osu.cz/en/surprising-life-in-depth-of-black-coal-mine/> accessed on 26 May 2022.
- TUF I. H., DÚBRAVKA L., HÚSKA L. & KOČÁREK P. 2018. The deepest living woodlouse in the Czech Republic. Acta Carpathica Occidentalis 9: 53–57.
- WALKER T. J. 2014. House cricket, *Acheta domesticus* (Linnaeus 1758). Singing Insects of North America. Available at: <https://orthsoc.org/sina/487a.htm> accessed on 28 May 2022.

STRESZCZENIE

[Głębokościowe stanowiska świerszcza domowego *Acheta domesticus* (Linnaeus, 1758) (Orthoptera: Gryllidae) na terenie kopalni węgla kamiennego na Śląsku Górnym (Polska)]

W pracy podano informacje o występowaniu świerszcza domowego *Acheta domesticus* na terenie Kopalni Węgla Kamiennego (KWK) „Budryk” (Ornontowice) i KWK „Pniówek” (Pawłowice) na Śląsku Górnym. Notowano je tam na głębokościach odpowiednio 900, 1050 i 1290 oraz 1050 metrów pod powierzchnią gruntu. Jest sprawą dyskusyjną jak świerszcze dostały się tak głęboko pod ziemię, choć według pracowników kopalni trafiły tam wraz z drewnem służącym np. do obudowy chodników. Pomimo panujących tam prawie przez cały czas ciemności, owady mają odpowiednie warunki termiczne do życia. Świadczy to o dużych zdolnościach adaptacyjnych tego gatunku.

Accepted: 12 September 2022