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New records of *Colletes hederae* Schmidt & Westrich, 1993 (Hymenoptera, Apiformes) in Poland

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Short communication

Kierat J. 2024. New records of *Colletes hederae* Schmidt & Westrich, 1993 (Hymenoptera, Apiformes) in Poland. *Acta zoologica cracoviensia* **67**: 1-6.

Abstract. The ivy bee *Colletes hederae* was recorded in the west and south of Poland in September 2023. While *C. hederae* is expanding its range in Europe, these are most probably the first records of the species in this country. The two localities, Górzyca (at the Polish-German border) and Kraków (S Poland), are situated about 450 km apart from each other. This suggests that the species is colonising the territory of Poland simultaneously from Germany, as well as from the Czech Republic and/or Slovakia.

Key words: range expansion, solitary bee, climate change, Anthophila, Colletidae.

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I. INTRODUCTION

Changes in the distribution of species can be a part of natural processes, but in recent years they are often the result of anthropogenic activity. Humans can directly affect a species' range (e.g. by killing out its representatives in a given area or by introducing them outside of the native range), They can also affect the distribution indirectly, through anthropogenic climate change (Hofmann et al. 2018; Biella et al. 2021). In recent decades, several bee species have been observed to expand their ranges. *Megachile sculpturalis* Smith, 1853 has been successfully spreading in Europe since its accidental introduction from Asia, and its range expansion has probably been accelerated by multiple introduction events and accidental transferring by humans between different localities (Lanner et al. 2021; Dubaić et al. 2022). On the other hand, *Bombus haematurus* Kriechbaumer, 1870, *Halictus scabiosae* (Rossi, 1790) and *Colletes hederae* Schmidt & Westrich, 1993 have increased their range without the direct influence of humans, although climate change is thought to be involved (Schweitzer and Theunert 2019; Hopfenmüller 2014).

The Ivy bee *Colletes hederae* is a member of the family Colletidae, described relatively recently as a new species (Schmidt & Westrich 1993). It belongs to the *succinctus* group, which now consists of three sibling species in Western Europe: *succinctus*,

halophilus and *hederae* (KUHLMANN et al. 2007). All three of the species are similar in morphology and are on the wing quite late in the season. They also have strong preferences towards distinct pollen sources. The broadly assumed status of *C. hederae* as a strict oligolege has been questioned, but it clearly prefers the ivy *Hedera helix* as both a pollen and a nectar source (MÜLLER and KUHLMANN 2008).

C. hederae is larger than the other two abovementioned species (about the size of a honeybee worker; Fig. 1A) and freshly-emerged individuals have ochre-coloured, wide tergal bands. The diagnostic microscopic characteristics that allow the species to be distinguished from among the other Polish *Colletes* species include the presence of a translucent hind margin of the first tergite, a punctation pattern of the first two terga, a row of dark hairs on the hind tibia, details of sculpture on the clypeus and microsculpture of the galea (AMIET 2014; FALK and LEWINGTON 2017; Fig. 1B-E, this paper).

II. METHODS

The observations in Górzyca (Western Poland, a few kilometres from the Polish-German border) took place on 16 and 17 September 2023, at about 10-11 a.m. on both days and at 15-16 p.m. on the first day, on the blooming ivy growing on a brick wall surrounding the cemetery (Fig. 2A).The ivy had grown up to 2 m in height.

The observations in Kraków were conducted on 22 September 2023, at about 10.30-12 a.m., on the ivy growing on the Wawel Castle grounds, a historic complex located near the city centre on the bank of the Vistula River.

The bees were caught with a net, killed with ethyl-acetate and were later identified under a stereomicroscope using the identification keys in AMIET (2014) and FALK & LEWINGTON (2017), and the photographs on Steven FALK's Flickr page (https://www.flickr.com/photos/63075200@N07/collections/72157633396536539/, accessed 20.09.2023).

III. RESULTS

In both of the examined localities, the ivy flowers were visited by a wide range of insects, including honeybees, wasps (Vespidae), flies (including hoverflies) and butterflies. Members of the genus *Colletes* were observed only during the visits that took place before noon.

The collected specimens are listed below (Fig. 2C):

– Górzyca (UTM VU71), municipal cemetery (52°29′30″N 14°39′23″E), 17 September 2023 at about 10-11 a.m., 2♀ *C. hederae* on *H. helix*, leg. et det. J. KIERAT (Fig. 1A-E)

– Kraków (UTM DA24), Wawel Castle (50°03′15″N 19°56′07″E), 22 September 2023 at about 10.30-12 a.m., 2♀ *C. hederae* on *H. helix*, leg. J. KIERAT, A. ŻMUDA, det. J. KIERAT.

Additionally, on 16 September at 11 a.m. in Górzyca, one *Colletes* cf. *hederae* female was observed foraging on the ivy flowers by me but the catch attempt failed. On 17 September, between 10 and 11 a.m. in Górzyca, at least one more female *Colletes* cf. *hederae* (apart from the two individuals that were caught earlier this day) was observed and photographed by me and K. ZAPOTOCZNY (Fig. 2B).

IV. DISCUSSION

This paper presents new evidence of *Colletes hederae* in Poland. To my knowledge, these are the first records of this species in the country. I know of no published records from Poland before September 2023. As valuable faunistic information is frequently recorded by amateurs and posted on public science platforms or social media (e.g. JASKUŁA et al. 2021), I also examined the iNaturalist database and some social media groups and blogs where photos of insects are posted, but this research revealed no reliable records of *C. hederae* in the country (i.e. with an added photo or from observers who are experienced in bee identification). Nonetheless, it can be assumed that after the first appearance of *C. hederae* in Poland, more records from the country will follow soon.

It is interesting to note that both of the reported records were separated by a distance of about 450 km. If the species were spreading into the Polish territory only from the west, it would be surprising that there were no earlier records from the area to the west of Kraków. It is also unlikely that the species would cover this distance in just one season. It is possible that the ivy bee was present but overlooked in previous years. However, there is an alternative possibility that the Kraków area, in contrast to Górzyca, was colonised from the south and not the west.

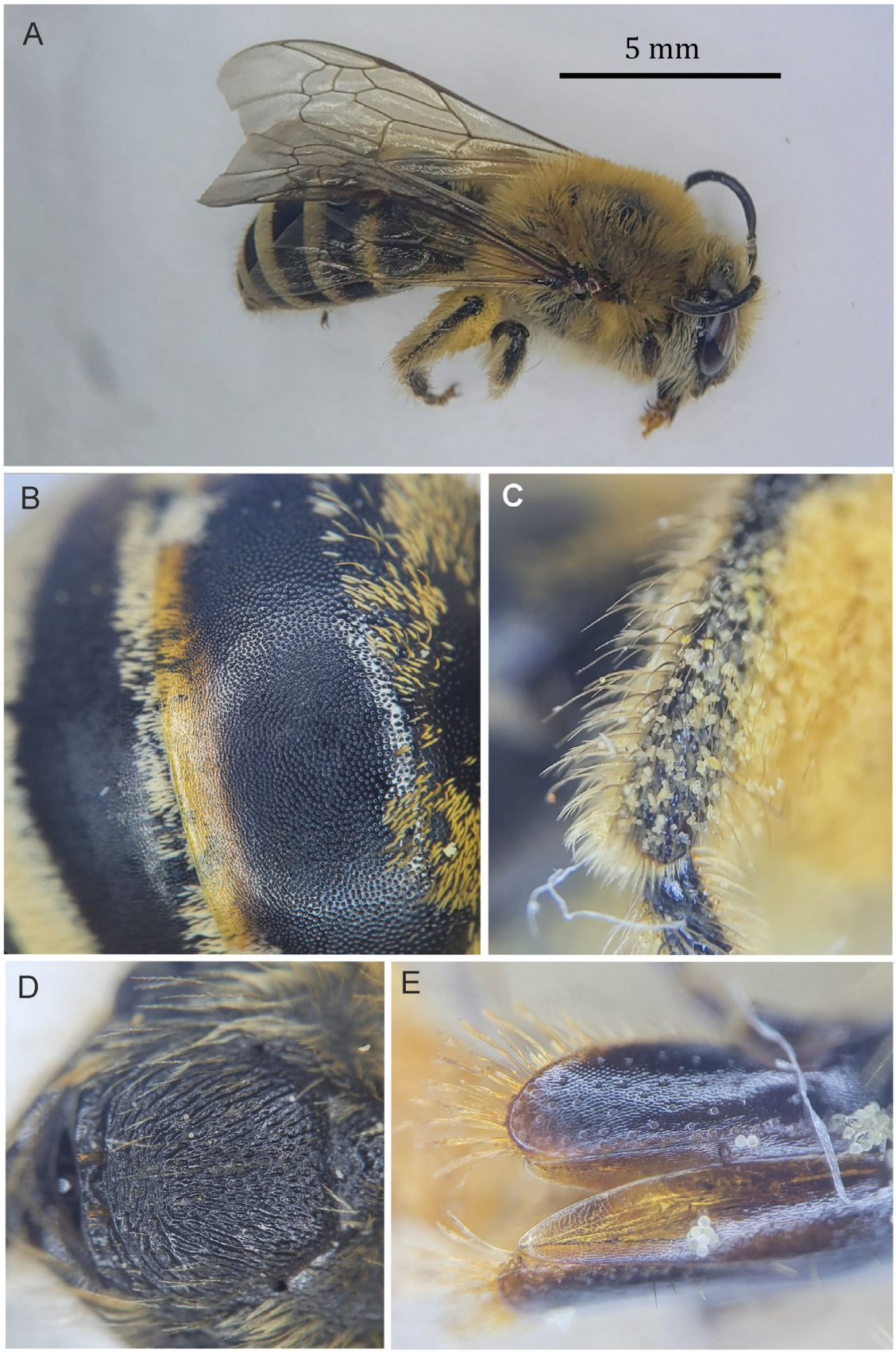

Fig. 1. *Colletes hederae*, a female collected in Górzyca on 17.09.2023: A – habitus; B – first two terga showing the translucent margin of tergite 1 and punctation; C – hind tibia showing a row of dark hairs; D – clypeus with the characteristic sculpture; E – tongue showing a diagnostic sculpture of the galea.

Fig. 2. Habitat of *Colletes hederae* in Górzyca and records in Poland. A – outer wall of the cemetery, overgrown by ivy (photo: N. DUER); B – female *C.* cf. *hederae* collecting pollen from the ivy (for a further explanation, see the text); C – new records of *C. hederae* in Poland: red dot – Górzyca, blue dot – Kraków, presented in the 10 × 10 km grid of the UTM coordinate system (created with MapaUTM ver 5.4, Grzegorz GIERLASIŃSKI, https://www.heteroptera.us.edu.pl/mapautm.html).

C. hederae is present both in Slovakia, where it was first recorded in 2017, and in Czech Republic, where it has been known since 2020 (BOGUSCH et al. 2021). The first phase of the expansion of *Halictus scabiosae* in Poland showed a similar pattern: all the records in 2020 and 2021 were located along the western border of the country; but in 2022 the species was discovered in Kraków, about 230 km from the nearest known Polish locality (KIERAT et al. 2023). It is suspected that *H. scabiosae* may have come over the mountains through the Moravian Gate. It is therefore possible that *C. hederae* followed a similar route.

Although examining a specimen might be crucial for the certain identification of *C. hederae*, especially in old and abraded individuals, this species can be often identified with a high level of probability in the field. It can easily be confused with honeybee and some hoverfly species, which are also frequently found on ivy, by an inexperienced observer. However, it can be distinguished with a low likelihood of mistake by amateur naturalists with more experience in bee identification, and by specialists on the basis of the photos. This makes the species an ideal case for involving citizen science in the monitoring.

In the UK this has been done since the first appearance of the ivy bee in 2001, where the monitoring is coordinated by BWARS (https://bwars.com/content/colletes-hederae-mapping-project, access 22.09.2023). In Poland, there are currently active public science projects that involve bee monitoring, e.g. the monitoring of *Xylocopa* spp., led by the Natura i Człowiek Association (Pawlikowski et al. 2018; Stowarzyszenie Natura i Człowiek 2022). As a result, there is the potential to run a similar project that would document the spread of *C. hederae* in Poland.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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