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Anthrenus (*Anthrenus*) *querneri* (Coleoptera: Dermestidae: Megatominae), a new species from Austria

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Anthrenus (*Anthrenus*) *querneri* (Coleoptera: Dermestidae: Megatominae), a new species from Austria

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Abstract. A **new species**, *Anthrenus* (*Anthrenus*) *querneri* Holloway (Coleoptera: Dermestidae: Megatominae) from Austria is described and compared with *A. pimpinellae* (Fabricius, 1775), the most similar species. Images of the habitus, ventrites, antenna, aedeagus, and sternite IX are presented. *Anthrenus querneri* represents the 26th species belonging to the Palaearctic *Anthrenus pimpinellae* complex.

Key words. Carpet beetle, *Anthrenus amandae*, *Anthrenus chikatunovi*, aedeagus, median lobe, sternite, taxonomy, distribution.

ZooBank registration. urn:lsid:zoobank.org:pub:EF3828C0-DDD2-4619-9F86-BC8626522465

Introduction

The Dermestidae contain over 1900 named species (Háva 2024). One of the larger genera within the family is *Anthrenus* Geoffroy, 1762 with nearly 300 species, including the Palaearctic *Anthrenus pimpinellae* (Fabricius, 1775) complex. All species within the complex have a fascia of white scales across the elytra, although the fascia is reduced in some species, e.g. *A. pfefferi* Kalík, 1954 and *A. mroczkowskii* Kalík, 1954. Some species are sufficiently alike to cause confusion (Háva and Herrmann 2019, 2020), which has likely constrained the rate of discovery of new species. Around the middle of the 20th century, only about nine species had been described belonging to the complex (see data in Háva 2024). Since the beginning of the 21st century, the number of known species has increased to 25 (Holloway and Herrmann 2024). This number will undoubtedly continue to increase, largely because species recognition within the complex is now predicated on the study of genitalia, principally male genitalia (Kadej et al. 2007; Holloway 2019, 2020, 2021; Holloway and Herrmann 2024; Holloway et al. 2024).

Many historic houses and museums in Austria are routinely surveyed for pest insect species (such as Dermestidae) as part of integrated pest management programs. During the spring survey period of 2022, a specimen was trapped and misidentified as *A. pimpinellae pimpinellae*. It is now recognized as a new species belonging to the *A. pimpinellae* complex and is here described as *Anthrenus* (s. str.) *querneri*.

Materials and Methods

In many Austrian museums and historic houses, sticky (blunder) traps are deployed to capture pest beetles and other species at ground level. About 5000 traps are regularly set across 65 buildings. Traps are renewed every six months, February or March and October or November. During the spring and summer, the traps are checked every 4 to 8 weeks and replaced if full of insects or dust. In the historic Schönbrunn Palace, all traps were set on 24th February 2022 and in the 'Millions Room' (sticky trap number 63) a single, slightly damaged *A. pimpinellae* complex individual was captured between 3rd May and 2nd June. The specimen was lifted from the trap glue using ethyl acetate. The specimen was clean and needed no further chemical treatment.

The Austrian specimen is held in the Natural History Museum, London (NHML). Twenty-nine *Anthrenus pimpinellae* specimens from across Europe were examined (NHML) along with 19 Greek *A. pimpinellae* held in the author's collection. All specimens were macerated in a solution of 2% acetic acid for five days to soften prior to dissection. Dissection was carried out under a Brunel BMSL zoom stereo LED microscope and

involved detaching the abdomen from the rest of the insect using two entomological pins. The soft tergites were then peeled away from the harder ventrites to expose the genitalia. The aedeagus was detached from the ring sclerite, and sternite IX was detached from the ring sclerite and the aedeagus. Habitus and ventrite images were captured at ×20 magnification using a Canon EOS 2000D camera mounted on the BMSL microscope. Images of aedeagus and sternite IX were captured at ×200 magnification for measurement using a Canon EOS 1300D camera mounted on a Brunel monocular SP28 microscope. After dissection, all body parts were mounted on card. The antennae were imaged at ×200 magnification through the SP28 microscope. All images were fed through Helicon Focus Pro version 8.2.2 focus-stacking software. All measurements were made using DsCap.Ink software version 3.90. Measurements taken:

- Body length (BL): distance from anterior margin of pronotum to the apex of the elytra
- Body width (BW): maximum distance across the single elytron ×2
- Antennal club length (AL): length of the last three antennomeres
- Antennal club width (AW): maximum width across the terminal antennomere
- Paramere length (PL): distance from the anterior end of the paramere to the apex of the paramere
- Sternite IX length (SL): distance from the tip of one anterior horn to the tip of the posterior lobe.

Scale bars were added using ImageJ 1.53M (Schneider et al. 2012). The distribution map was generated using SimpleMappr (Shorthouse 2010).

Results

Anthrenus (*Anthrenus*) *querneri* Holloway, new species

Figures 1–3

Type specimens. Holotype male. Schönbrunn Palace, Vienna, Austria (48.183, 16.307), 3rd May 2022 to 2nd June 2022, Pascal Querner leg. NHML.

Paratypes. None.

Description, external characteristics. Holotype *Anthrenus* (*Anthrenus*) *querneri* (Fig 1A) (BL = 3.07 mm, BW = 2.26 mm) with a single pale brown ocellus on face well below the level of the top of the eyes. A large notch in the lower inner margin of each eye. Integument very dark brown to black. Head covered in black scales apart from small patch of white scales on vertex in center, and patches of brown scales scattered along the inner eye margins,

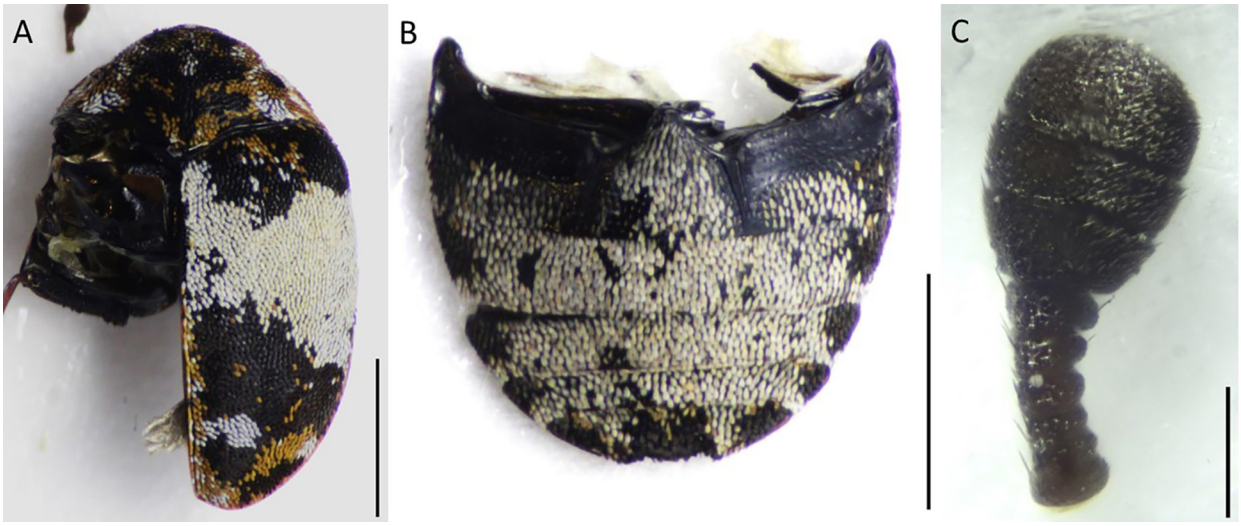

Figure 1. *Anthrenus querneri*. **A)** Habitus (left elytron missing, scale bar = 1 mm). **B)** Abdominal ventrites (scale bar = 1mm). **C)** Detached antenna (scale bar = 100 μm).

especially in the notch. Pronotum covered in white and orange scales, especially on outer thirds, with patches of black scales mostly on inner third. Only the right elytron remains on the specimen. Prominent white fascia crosses the elytron extending down the elytral suture from the scutellum for about 2/5 of the length of the elytron, extending across the elytron as an expanding band to cover ½ of the length of the elytron at the margin. White fascia almost entirely an unbroken block of white scales apart from small patches of black scales sub-sutural and sub marginal, ⅓ down elytron in both cases, and a few black scales at the lower marginal edge of the white fascia.

Ventrites (Fig. 1B) covered in white tinted brown scales. Large patches of black scales at margins of each ventrite, largest on ventrite I which merges with the black marginal patch on ventrite II. Ventrite V mostly covered in black scales, pale scales only reaching the posterior margin at two points with just a few scales at the anterior edge of the marginal black spots on ventrite V. A small number of pale brown scales mixed in with the pale scales on ventrite V.

Eleven segmented antenna (Fig. 1C) (AL = 194 μm, AW = 152 μm) has a broad, symmetrical rectangular club consisting of the terminal three antennomeres. The antenna and legs are dark red. Anterior faces of femora covered in white, with pale brown scales proximally and distally, and mostly black scales medially.

Description, internal characteristics. Aedeagus (Fig. 2A) has broad parameres (PL = 373 μm). Parameres have rounded lateral margins, curving into relatively sharp apices that angle in towards each other. The apical ⅖ of the inner margins are almost parallel where they narrow sharply and continue to the anterior end as relatively narrow curved rods. The surface of the broad, paddle shaped terminal ⅖ of each paramere is covered in long, narrow setae that point inwards towards the median lobe. Posterior tips of parameres pale. Median lobe very broad at base that narrows gradually to blunt, rounded, slightly expanded tip, and is slightly shorter than the parameres.

Sternite IX (Fig. 2B, SL = 473 μm) with broad posterior lobe. The apex is clear laterally, the rest of the sternite is pale brown. The medial apex of the posterior lobe is a smooth, shallow curve. The clear lateral components of the apex are covered in setae, longest towards the lateral corners and absent along the apical margin. The setae

Figure 2. *Anthrenus querneri*. **A)** Aedeagus dorsal aspect. **B)** Sternite IX. Scale bar = 100 μm in both cases.

Figure 3. Location of collection of *Anthrenus querneri* holotype.

extend down the lateral margins becoming progressively shorter to the mid-point where the margins narrow to form a neck. From the neck, the margins diverge and continue as smooth curves to the anterior, ending in two narrow, curved horns.

Distribution. Only known from the holotype collected in the Schönbrunn Palace, Vienna, Austria. (Fig. 3).

Etymology. *Anthrenus* (*Anthrenus*) *querneri* is named after the collector, Pascal Querner, who is the IPM manager for the Museum of Natural History, Vienna.

Differential diagnosis. Initially, *A. querneri* was misidentified as *A. pimpinellae* (Fig. 4A). *Anthrenus pimpinellae*

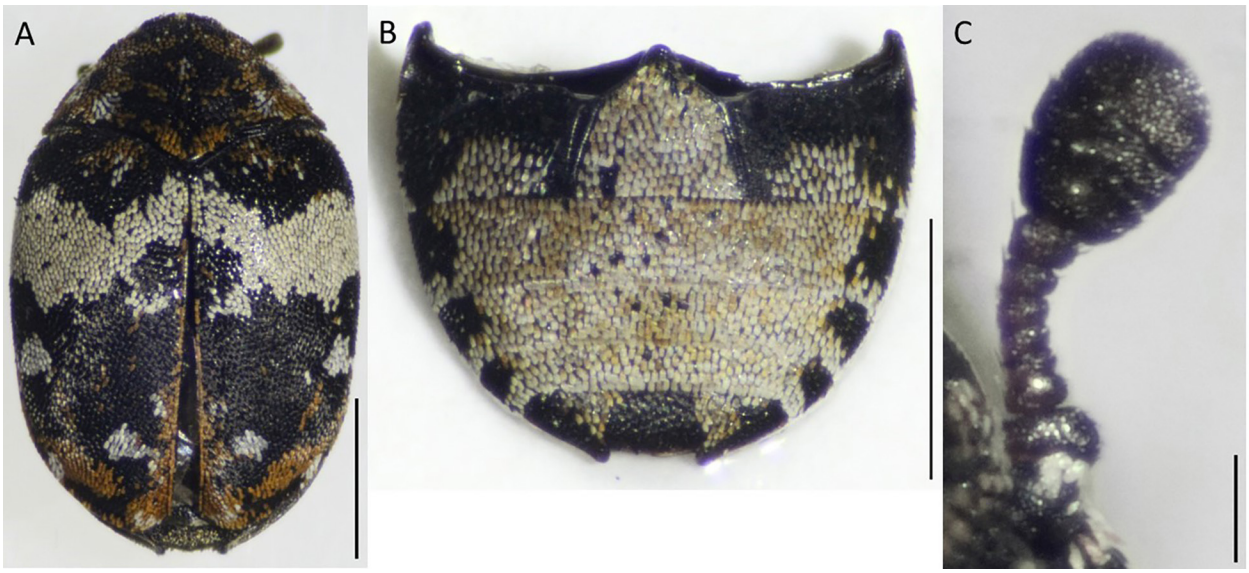

Figure 4. *Anthrenus pimpinellae*. **A)** Habitus (scale bar = 1 mm). **B)** Abdominal ventrites (scale bar = 1mm). **C)** Antenna (scale bar = 100 μm).

white fascia is much narrower than *A. querneri* and overall *A. pimpinellae* has a narrower profile than *A. querneri*. Holloway and Bakaloudis (2020) provide a BW/BL value of 0.688 ± 0.029 for *A. pimpinellae*, and BW/BL for *A. querneri* holotype is 0.736, indicating that *A. querneri* is broader than an average *A. pimpinellae*. It is not obvious that the ventrites (Fig. 4B) and the antennal structure (Fig. 4C) differ between *A. querneri* and *A. pimpinellae*, although perhaps *A. querneri* ventrites are covered in cleaner white scales than *A. pimpinellae*.

Anthrenus pimpinellae parameres (Fig. 5A) have more strongly curved lateral margins than *A. querneri*. On the inner margin, the paramere paddles are longer than *A. querneri*, extending more than half the length of the paramere, whereas the paddles of *A. querneri* are considerably less than half the paramere length. *Anthrenus pimpinellae* median lobe is broad at the base but narrows more sharply than *A. querneri* terminating in a long, slim apex, much slimmer than *A. querneri*.

Anthrenus pimpinellae sternite IX (Fig. 5B) is almost entirely pale brown with only the very outer apical edges of the posterior lobe being clear. All setae are longer than *A. querneri* and clustered along the margins rather than spreading into the posterior lobe disc as in *A. querneri*.

Discussion

The number of known species within the Palaearctic *A. pimpinellae* complex continues to increase. Holloway and Herrmann (2024) list 25 species, this study increases the number to 26. This is the third *A. pimpinellae* lookalike species described from Europe, the others being *A. amandae* Holloway, 2019 from Mallorca and *A. chikatunovi* Holloway, 2020 from the Pyrennees. As well as similar color patterns, all also have quadrate antennal clubs. Insect

Figure 5. *Anthrenus pimpinellae*. **A)** Aedeagus dorsal aspect. **B)** Sternite IX. Scale bar = 100 µm in both cases.

species in Europe are extensively studied so it does beg the question, how many more cryptic *A. pimpinellae* complex species remain to be discovered, particularly from less studied parts of the Palaearctic.

Anthrenus querneri is compared here with a typically patterned *A. pimpinellae*. It should be borne in mind that a small proportion of *A. pimpinellae* specimens from Greece have broader white bands than shown in Fig. 4A, so the width of the white band might not always be a reliable identification cue. Only a single *A. querneri* is currently known. More specimens need to be found and studied to discover more and better ways to distinguish between *A. querneri* and *A. pimpinellae* using external features alone.

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