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Anthrenus (s. str.) *semipallens* sp. nov., a new species from Spain (Coleoptera: Dermestidae: Anthreninae)

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Abstract

During an examination of Spanish *Anthrenus* spp. held in Andreas Herrmann's private collection, four specimens of a new species were noted: *Anthrenus* (*Anthrenus*) *semipallens*. Images of habitus features, including antenna, are presented and compared with other *Anthrenus* species thought to occur in Spain. *A. semipallens* is small so some comparison species could be eliminated courtesy of size. Although *A. semipallens* doesn't resemble the colour pattern of any other species, the possibility that *A. semipallens* is an unknown colour variant of a comparison species was considered. The *A. semipallens* specimens were dissected and the aedeagus compared with aedeagi from all other possible species. There was no similarity. *Anthrenus semipallens* is a valid new species.

Key words: aedeagus, sternite IX, habitus, dissection, Megatominae

Introduction

The Dermestidae Latreille, 1804 are a poorly known family of Coleoptera and, as a result, new species are being discovered at a remarkable rate (see data in Háva 2023a). Since the publication of Mroczkowski's (1968) world catalogue, the number of species known has increased by approximately 1000 species to over 1800 species (Háva 2023a). Some genera are highly speciose, such as *Anthrenus* Geoffroy, 1762, and many new *Anthrenus* species are being discovered. Over 250 species have been assigned to *Anthrenus*, a genus split into 10 subgenera, but only one of these is not considered polytypic: *Anthrenus* s. str. (Kadej 2018). It is possible that the taxonomy of the genus *Anthrenus* needs to be reconsidered.

Large collections of Dermestidae that carry extensive runs of species are proving very valuable sources of new species, in particular when dissection is carried out to inspect the genitalia. Beal (1998) and Kadej *et al.* (2007) demonstrated the value of dissection to identify species of Dermestidae, for example Háva (2022, 2023b, c), Holloway (2019, 2020, 2021), Holloway and Bakaloudis (2020), Holloway *et al.* (2020), and Holloway and Herrmann (2023). Whilst going through runs of specimens collected in Spain, four specimens with an unusual colour pattern were noticed. The description of a new species from Spain, *Anthrenus* (s. str.) *semipallens*, is presented here.

Materials and methods

The study specimens were from Andreas Herrmann's (AHEC) collection. The specimens were macerated in a solution of 2% acetic acid for five days to allow removal from staging 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. For males, the aedeagus was detached from the ring sclerite, and then sternite IX was detached from

the ring sclerite and the aedeagus. Females were similarly dissected to confirm sex, but no further examination of female genitalia was carried out. Habitus images, both upper and under sides, were captured at $\times 20$ magnification using a Canon EOS 2000D camera mounted on the BMSL microscope. Images of aedeagi and (male) sternite IX were captured at $\times 200$ magnification using a Canon EOS 1300D camera mounted on a Brunel monocular SP28 microscope. After dissection, all body parts were mounted on card. Antennae were teased out and images were taken at $\times 200$ magnification through the SP28 microscope. All images were fed through Helicon Focus Pro version 8.0 focus-stacking software. Habitus measurements were made using a micrometre fitted into an eyepiece of the BSML microscope. Measurements taken:

- Body length (BL): distance from anterior margin of pronotum to the apex of the elytra
- Body width (BW): maximum distance across the elytra.

Natural History Museum, London (NHML)

Results

Anthrenus (Anthrenus) semipallens sp. nov. (Figures 1–2)

Specimen examined. New record (holotype) for *Anthrenus* (s. str.) *semipallens* sp. nov. Spain, Salamanca, Villarejo (N 40.472, E -6.457), 4th July 2017 J. Marmaneu and E. Micó leg. Holotype ♂ AHEC. Paratypes: Spain, Salamanca, Escurial de la Sierra (N 40.618, E -5.95) 4th July 2017 J. Marmaneu and E. Micó leg. (one male NHML); Spain, Salamanca, Morillo (N 40.972, E -5.663) 4th July 2017 J. Marmaneu and E. Micó leg. (one male AHEC); Spain, Salamanca, (N 40.970, E -5.668) 5th July 2017 J. Marmaneu and E. Micó leg. (one female AHEC).

External characteristics. Holotype habitus dorsal aspect Figure 1A (BL = 2.5 mm, BW = 1.75 mm). Integument head and pronotum black, margin of pronotum tinged red, basal 1/6th of elytra black, rest of elytra red. Sharp demarcation between black and red integument of elytra. Elytra loosely covered with white and yellow to pale orange scales, many of which appear to be rectangular and square-ended (Figure 1B). Scales not arranged in any particular patterns with no obvious spots or fasciae. Scutellum small and black. Ventrites (Figure 1C) covered in off-white, slightly translucent, loosely packed scales. Scales along outer margins of sternites III, IV, and V more densely packed, have a hint of yellow in them, and increase in density towards the tip of sternite V. Single brown ocellus between eyes. Head entirely covered in black scales. Eyes emarginated on inner margin. Femora, tibiae, and tarsi entirely red with a few whitish scales on the femora. 11-segmented antenna (Figure 2A) red throughout. Last three antennomeres forming a well-defined, slightly asymmetric, tear-drop shaped club that expands from antennomere 9 to antennomere 11. Broad sutures separating antennomeres 9 to 11.

Internal characteristics. Aedeagus (Figure 2B) has two broad, symmetrical parameres diverging from base before curving evenly inwards ending in blunt tips. Dorsal (concave) surface of each paramere carry inward pointing hairs. Base of median lobe broad, margins converge but are slightly sinuous, ending in a very thin finger-like projection. Sternite IX (Figure 2C) has a broad, slightly convex posterior tip carrying stout setae concentrated at outer corners. Strong setae continue down the outer margins beyond the narrowest part of the well-defined neck.

Etymology. The name *semipallens* translates from Latin as ‘almost pale’ referring to the pale appearance of the new species.

Differential diagnosis. The only *Anthrenus* s. str. species from Spain (Holloway *et al.* 2019) that marginally resembles *A. semipallens* externally are examples of very pale *A. isabellinus* Küster, 1848 (Figure 3), although *A. isabellinus* is generally much larger and rounder than *A. semipallens*. There are species in different subgenera that generally resemble *A. semipallens*, including *A. (Anthrenodes) bellulus* Kocher, 1955 and *A. (Helocerus) minutus* Erichson, 1846. Careful inspection of the number of antennal segments and the absence of a notch on the inner margin of the eye will quickly eliminate these species as candidates.

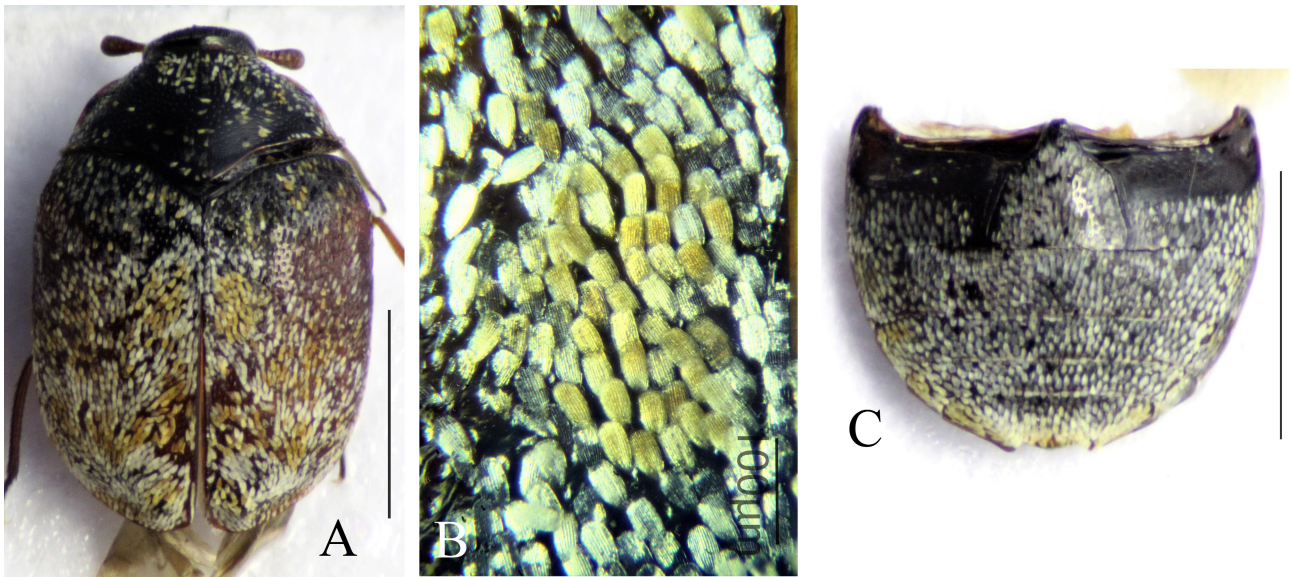


FIGURE 1. *Anthrenus semipallens* sp. nov. Holotype. A: habitus dorsal aspect, B: elytral scales, C: ventrites. Scale bars = 1 mm.



FIGURE 2. *Anthrenus semipallens* sp. nov. Holotype. A: Antenna, B: aedeagus ventral aspect, C: sternite IX. Scale bars = 100 μ m.



FIGURE 3. *Anthrenus isabellinus* pale example. Scale bar = 1 mm.

There are *Anthrenus* species that display colour variation, either fairly discrete variants as in *A. delicatus* Kiesenwetter, 1851 (Herrmann 2023) or continuous colour pattern plasticity as in *A. isabellinus* (Holloway *et al.* 2022). Is it possible that *A. semipallens* is a colour variant of another species? *Anthrenus semipallens* is small. The male paratypes measure BL 2.75 mm x BW 1.9 mm and BL 2.5 mm x BW 1.8 mm, and the female paratype BL 2.6 mm x BW 1.85 mm, average BL 2.59 mm x BW 1.82 mm, BW/BL = 0.703. These dimensions eliminate *A. goliath* Mulsant & Rey, 1868 (Herrmann 2023) and *A. flavipes* LeConte, 1854 (Armstrong *et al.* 2023) since they tend to be larger. *Anthrenus pimpinellae* (Fabricius, 1775), *A. amandae* Holloway, 2019 (Holloway and Bakaloudis 2020) and *A. scrophulariae* (Linnaeus 1758) (Holloway unpublished data) have BW/BL less than 0.703. *Anthrenus angustefasciatus* Ganglbauer, 1904 has BW/BL greater than 0.703 (Holloway and Herrmann 2023). The dimensions of *A. chikatunovi* Holloway, 2020 (Holloway 2020), *A. delicatus* (Holloway unpublished data), *A. festivus* Erichson, 1846 (Holloway 2023), and *A. munroi* Hinton, 1943 (Holloway and Cañada Luna 2022) correspond to *A. semipallens* both in terms of BL and BW/BL. Finally, *A. miniopictus* Bedel, 1884 is recorded as having BL = 2.5 mm (Herrmann 2023). *Anthrenus chikatunovi*, *A. delicatus*, *A. festivus*, *A. miniopictus*, and *A. munroi* all need to be considered as potential confusion species. In addition, *A. isabellinus* is included courtesy of superficial external resemblance. Figure 4 shows the aedeagi of these six species. None of them resemble the aedeagus shown in Figure 2B. *A. semipallens* is a valid species.

Given these results, Table 1 shows a key to the *Anthrenus* s. str. in Spain according to Holloway *et al.* (2019)

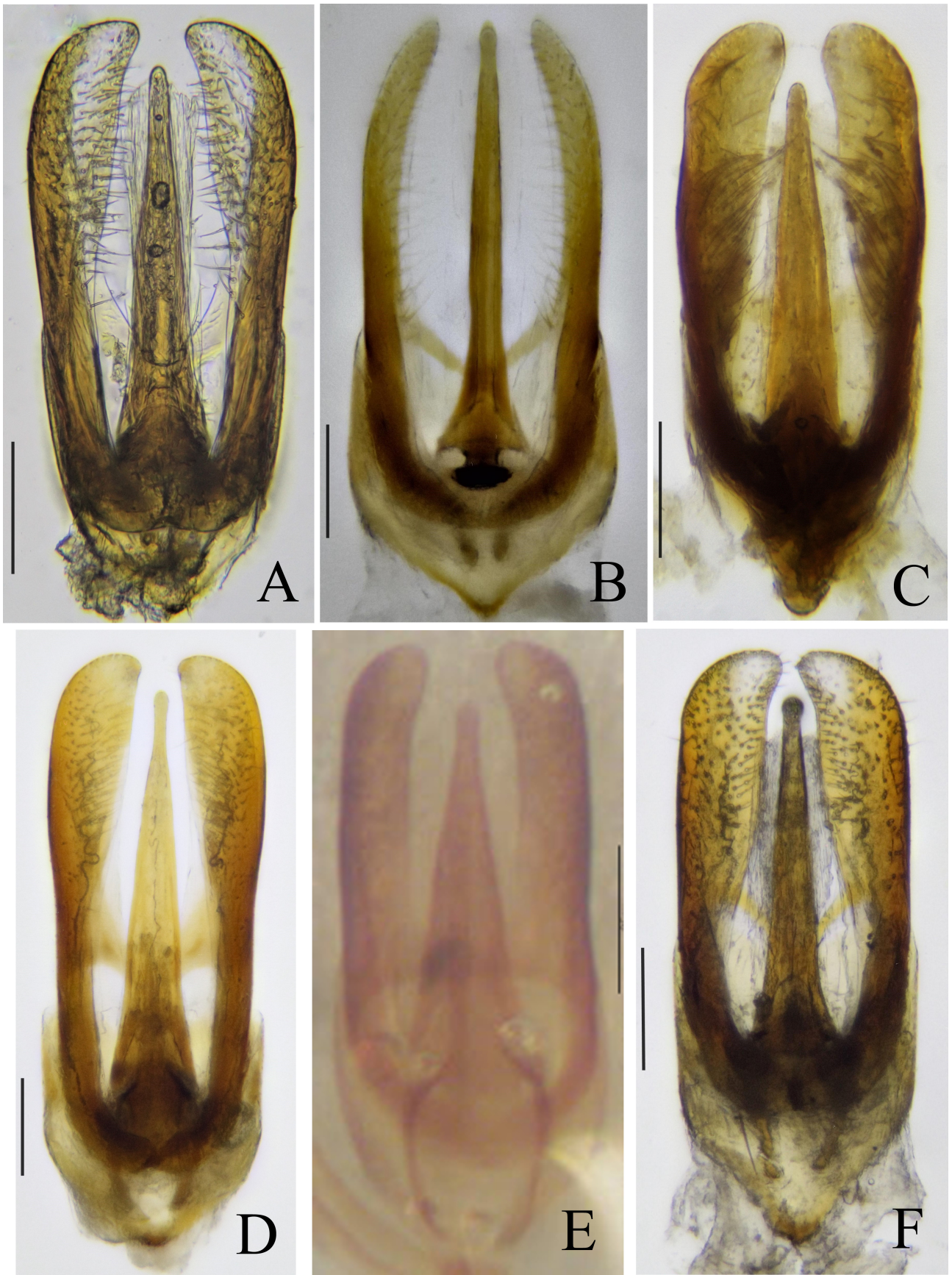


FIGURE 4. Aedeagi. A: *Anthrenus chikatunovi*, B: *Anthrenus delicatus*, C: *Anthrenus festivus*, D: *Anthrenus isabellinus*. E: *Anthrenus miniopictus*, F: *Anthrenus munroi*. Scale bars = 100 μ m.

TABLE 1. Brief key to separate *A. semipallens* from other *Anthrenus* spp. occurring in Spain according to Holloway *et al.* (2019).

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- 1) 11-segmented antennae with 3-segmented club. Notch on inner margin of eye: *Anthrenus* s. str. (2)
 - Not with above combination of features: other *Anthrenus* sub-genus.
 - 2) White sub-basal fascia crossing elytra, can be broad or narrow (and broken) but always obvious against a background of black or dark brown scales: typical form species from the *Anthrenus pimpinellae* complex.
 - Sub-basal fascia a different colour or not obviously present (3)
 - 3) Sub-basal fascia orange (white at margins): *A. miniopictus*.
 - No obvious sub-basal fascia (4)
 - 4) Covered mostly in orange scales with white spots: *A. delicatus* var. *armstrongi*.
 - Different colour pattern (5)
 - 5) Clear white spots on a background of large patches of bright orange scales and patches of black scales: *A. flavipes*.
 - Different colour pattern (6)
 - 6) Line of orange, red or brown scales along the elytral suture (7)
 - No line of red or brown scales along the elytral suture (8)
 - 7) Scales along elytral suture red or bright orange forming a broad, vertical band. Three fasciae, sub-basal, middle, and sub apical: *A. scrophulariae*.
 - Scales along elytral suture brown forming a narrow vertical band. No fasciae but six white spots on each elytron: *A. festivus*.
 - 8) Elytra mostly covered in creamy white scales admixed with some pale orange scales, darker scales at the base of elytra. Rounded body profile and almost always greater than 3mm long: pale *A. isabellinus* (Figure 3).
 - Posterior 2/3 of elytra covered in loose white scales with patches of yellow scales. Small ~2.5mm: *A. semipallens* **sp. nov.**
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Discussion

The Dermestidae of Western Europe have been relatively well studied (see Háva (2023) and information therein) and a recent checklist of Spanish Dermestidae has been published (Holloway *et al.* 2019). Despite that, new species of *Anthrenus* continue to be discovered in the region: *A. amandae* (Mallorca), *A. chikatunovi* (Pyrenees), and now also *A. semipallens*. *Anthrenus semipallens* is a distinctive species with little chance of confusion with other species (unlike *A. amandae* and *A. chikatunovi*), so it is surprising that it has not previously been discovered. It is possible that *A. semipallens* is a scarce species or very locally distributed accounting for its recent discovery, but without additional data from the field it would be unwise to speculate further.

The study reinforces the need to dissect *Anthrenus* (and other Dermestidae) to authenticate identification and the validity of newly described species. The discovery of *A. semipallens* brings the number of *Anthrenus* species claimed for Spain to 24 (Holloway *et al.* 2019). This number is likely to evolve through more species discoveries and improved knowledge of distributions as research on Dermestidae expands.

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