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Anthrenus (Anthrenus) buonpanei sp. nov. (Coleoptera: Dermestidae: Megatominae), a new species from Italy, and comparison with Spanish and Eastern European *Anthrenus (A.) corona* Holloway, 2021

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Abstract: A new dermestid species, *Anthrenus (Anthrenus) buonpanei* sp. nov. (Coleoptera: Dermestidae: Megatominae) is described from Italy and compared with *Anthrenus (Anthrenus) corona* Holloway, 2021 from Spain and Eastern Europe. For the new species, images of male habitus (dorsal and ventral), antenna, aedeagus and sternite IX are presented. Images of the female sclerites in the bursa copulatrix are also shown. The possible distributions of *A. buonpanei* and *A. corona* are discussed. No evidence could be found suggesting Spanish *A. corona* differ from Eastern European *A. corona*.
Key words: Coleoptera, Dermestidae, *Anthrenus buonpanei*, new species, species group, *Anthrenus corona*, dissection, giant species, *Anthrenus pimpinellae*, taxonomy, Italy.

Resumen: *Anthrenus (Anthrenus) buonpanei* sp. nov. (Coleoptera: Dermestidae: Megatominae), una nueva especie de Italia, y comparación con *Anthrenus (A.) corona* Holloway, 2021 de España y Europa Oriental. Se describe una nueva especie de derméstido, *Anthrenus (Anthrenus) buonpanei* sp. nov. (Coleoptera: Dermestidae: Megatominae) procedente de Italia y se compara con *Anthrenus (Anthrenus) corona* Holloway, 2021 procedentes de España y Europa Oriental. Para la nueva especie se presentan imágenes del habitus del macho (dorsal y ventral), antena, edeago y esternito IX. También se muestran imágenes de los escleritos de la bursa copulatrix de la hembra. Se discute la posible distribución de *A. buonpanei* y *A. corona*.
Palabras clave: Coleoptera, Dermestidae, *Anthrenus buonpanei*, nueva especie, grupo de especies, *Anthrenus corona*, disección, especie gigante, *Anthrenus pimpinellae*, taxonomía, Italia.

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Introduction

The Dermestidae is a moderately large family of Coleoptera, numbering about 2000 species (Háva, 2025). The rate of discovery of new species has been rapid over the last two decades, but shows no signs of levelling off (Háva, 2025). Within the Dermestidae is the large genus *Anthrenus* Geoffroy, 1762 with about 330 species (Háva, 2025) spread across 10 subgenera that are defined largely by number of antennomeres (Peacock, 1993). The largest subgenus is *Anthrenus* with about 100 species (Holloway, 2026a) which includes all the Palaearctic *Anthrenus pimpinellae* (Fabricius, 1775) group species (Kadej *et al.*, 2007; Holloway, 2026a). Species in this group possess black, white, and orange (or yellow, through to pale brown) scales (Kadej *et al.*, 2007; Holloway & Cañada Luna, 2022; Holloway, 2026a). Most of the white scales form a sub-basal, trans-elytral fascia set in a background of dark scales. All Palaearctic species sharing this general colour pattern are considered *A. pimpinellae* group

species (Holloway, 2026a). The rate of discovery of new *A. pimpinellae* group species is illustrated by the 17 species included in Kadej *et al*. (2007) increased to 36 species included in Holloway (2026a).

Anthrenus corona Holloway, 2021 was illustrated by Kadej *et al*. (2007) but confused with *A. goliath* Saulcy in Mulsant & Rey, 1868 (Holloway & Herrmann, 2024a). *Anthrenus corona* has been described as a 'giant' species, much larger than most other *Anthrenus pimpinellae* group species measuring in excess of 4 mm (Holloway, 2025a; Holloway *et al*., 2025; Pintilioaie *et al*., 2025). *Anthrenus corona* was first described from Turkey (Holloway, 2021), but subsequently found in Romania (Pintilioaie *et al*., 2025), Greece and Armenia (Holloway *et al*., 2025). Holloway *et al*. (2025) argued that *A. corona* was most likely a species of eastern Europe and western Asia, so it was a surprise when *A. corona* was also described from Spain (Holloway, 2025a). Háva (pers. comm. 2026) pointed out that Spain was included in *A. corona* distribution by Háva (2025), but Holloway & Herrmann (2024a) and Holloway *et al*. (2025) argued that *A. corona* had been most likely and continually confused with *A. isabellinus* Küster, 1848 and *A. goliath*, so the distribution provided in Háva (2025) could not be considered reliable. Also, apart from the records from Turkey, Armenia, Greece, Romania, and Spain no definitive records of *A. corona* from any other country have ever been published. Here two large *A. pimpinellae* group specimens from Italy were investigated. In the current study, a new species belonging to the *A. pimpinellae* species group, *Anthrenus (Anthrenus) buonpanei* Holloway & Rosenthal sp. nov., is described.

Materials and methods

Study specimens were obtained from Staatliches Museum für Naturkunde, Stuttgart, Germany and Naturalis Biodiversity Centre, Leiden, The Netherlands. Specimens were relaxed in 5% acetic acid for a day 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 then sternite IX was detached from the ring sclerite and the aedeagus. Habitus images, both dorsal and ventral views, were captured at ×20 magnification using a Canon EOS 2000D camera mounted on the BMSL microscope. Images of aedeagi and sternite IX were captured at ×100 magnification using a Canon EOS 1300D camera mounted on a Brunel monocular SP28 microscope. After dissection, all body parts were mounted on a card. The antennae were teased out and images were taken at ×100 magnification through the SP28 microscope. Sclerites from the bursa copulatrix were flattened under a slide cover slip and imaged at ×200. All images were processed using Helicon Focus Pro version 8.2.2 focus-stacking software. Habitus measurements were made using a calibrated eyepiece. All other measurements were made using ImageJ 1.53M (Schneider *et al*., 2012).

Measurements were taken as follows:

- Body length (BL): distance from anterior margin of pronotum to the apex of the elytra.
- Body width (BW): distance across widest part of abdomen.
- Paramere length (PL): distance from the anterior end of the parameres to the apex of the parameres.
- Median lobe length (ML): distance from posterior tip to tip of one anterior stirrup.
- Sternite IX length (SL): distance from the tip of one anterior horn to the tip of the posterior lobe.

The distribution map was created using SimpleMappr (Shorthouse, 2010). Scale bars were added using ImageJ 1.53M.

Abbreviations used:

NHMUK = Natural History Museum, London, England.
RMNH = Naturalis Biodiversity Centre, Leiden, The Netherlands.

Results

Taxonomy

Dermestidae Latreille, 1803
Megatominae Leach, 1815
Anthrenini Gistel, 1848
Anthrenina Gistel, 1848
Anthrenus Geoffroy, 1762

***Anthrenus (Anthrenus) buonpanei* Holloway & Rosenthal, sp. nov.** (Figs. 1–3)

Type specimens. Holotype male. Italy, Mount Muto, Piedimonte Matese, prov. Caserta (41.366, 14.399), 485 m.a.s.l., May 2026 P. Buonpane leg. [NHMUK].

Paratypes. One female, same data as holotype. [NHMUK].

Specimens found on *Oenanthe pimpinelloides* L. and *Orlaja grandiflora* (L.) Hoffm. (Fig. 1).

Fig. 1.- *Anthrenus (A.) buonpanei* Holloway & Rosenthal sp. nov., on *Orlaja grandiflora* in the field.

Description, external characteristics (holotype male). BL = 4.33 mm, BW = 3.01 mm, BW/BL = 0.695. Head and pronotal integument (Fig. 2A) dark brown to black, single reddish-brown ocellus in centre of face level with top of eyes. Lower inner eye margins notched. Vertex covered in black scales down to ocellus, orange with occasional white scales at lateral margins. Face covered mostly in orange scales with some white scales between ocellus and eye and across base of face. Black scales mixed with orange scales from eye margins to disk of face. Small, narrow orange and white scales on extended clypeus. Labrum dark brown. Pronotum with mostly orange and black scales, some white scales, especially along lateral margins. Orange scales mostly in anterior half and lateral sections of pronotum, black scales concentrated across disk and posterior margin of pronotum. Elytral integument (Fig. 2B) dark brown basally, dark reddish-brown towards apices. Elytra with orange,

black and white, flat oval scales approximately twice as long as wide. Elytra with prominent, relatively narrow sub-basal transverse fascia of white scales. Fascia widest at lateral margins, narrowing towards elytral suture. Anterior margin of fascia directed postero-mesally from lateral margin to mid-disc, then abruptly angled anteriorly (forming distinct step), continuing transversely to meet elytral suture immediately posterior to scutellar shield. Sparse scattering of white scales present anterior to main fascia near elytral suture, loosely connecting fascia to elytral base. Posterior margin broadly even across lateral two-thirds of elytral width, interrupted only by distinct posterior projection in sub-lateral region (weakly connecting to separate sub-lateral patch of white scales). At inner third of elytral width, posterior margin of fascia forms a shallow concavity followed by a second, postero-mesal projection angled posteriad. Immediately at suture, fascia strongly constricted and forms a narrow posterior extension of white scales.

Smaller patches of white scales present sub-apically, scattered from elytral suture towards lateral margin. Some orange scales occur along basal margin, especially close to scutellar shield; more orange scales patchily scattered posterior to elytral fascia, occasionally forming indistinct longitudinal lines, and mixed with sub-apical patches of orange and white scales. Orange and white scales set against background of black scales.

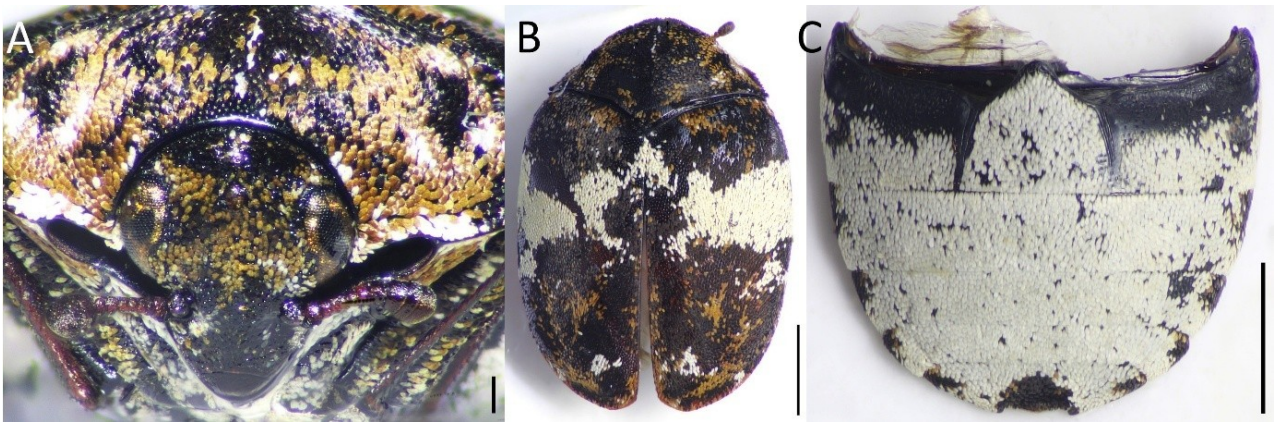

Fig. 2.- *Anthrenus (A.) buonpanei* Holloway & Rosenthal sp. nov., holotype male. **A.-** Head (scale bar = 100 µm). **B.-** Habitus (scale bar = 1 mm). **C.-** Ventrites (scale bar = 1 mm).

Ventrites (Fig. 2C) with black integument covered in white scales. Patches of black scales at lateral margins of ventrites 2–5, patches edged with small number of orange scales. Apex of ventrite 5 with larger, semi-circular patch of black scales, again edged with some orange scales.

Antenna (Fig. 3A) with 11 antennomeres, antennomeres 1 and 2 equal sized, globular, reddish and reddish-brown, antennomeres 3–8 red, transverse, antennomeres 9–11 reddish-brown and forming a cubic, hirsute club. Terminal antennomere evenly rounded, same length as antennomeres 9 and 10 combined. Femora dark brown, tibiae and tarsi red (Fig. 2A). Anterio-ventral surfaces of femora with orange and white scales.

Description, external characteristics (female). BL = 4.17 mm, BW = 2.95 mm, BW/BL = 0.707. Female similar externally in all respects to male, except terminal antennomere shorter than length of antennomeres 9 and 10 combined.

Description, internal characteristics (holotype male). Aedeagus (Fig. 3B) brown with evenly bowed, brown parameres (PL = 540 µm). Parameres expand only slightly from base to white apices. Outer margin in posterior 1/3 with row of evenly spaced setae. Some setae on inner sides of paramere apices, no setae on inner paramere margins. Median lobe (ML = 590 µm) broad at base, margins converging to narrow, slightly bulbous tip that falls short of paramere apices. Anterior end of median lobe with two curved, converging stirrups. Sperm duct on ventral surface of median lobe extremely

broad, reaching parameres. Sternite IX (Fig. 3C, SL = 660 µm) pale brown, broad, angular. Posterior lobe with clear neck at base, margins evenly curve posteriad to flat posterior margin. Posterior margin and first 1/3 of lateral margins with paler tissue. Pale tissue with stout, straight, sharp, marginal and sub-marginal setae. Some setae lining margin down to posterior lobe neck. Single setae in centre of posterior lobe. From neck lateral margins sweep outwards to knuckle, beyond knuckle two very slightly converging, straight horns pointing anteriad.

Fig. 3.- *Anthrenus (A.) buonpanei* Holloway & Rosenthal sp. nov., holotype male. **A.-** Antenna. **B.-** Aedeagus. **C.-** Sternite IX. Scale bars = 100 µm in all cases.

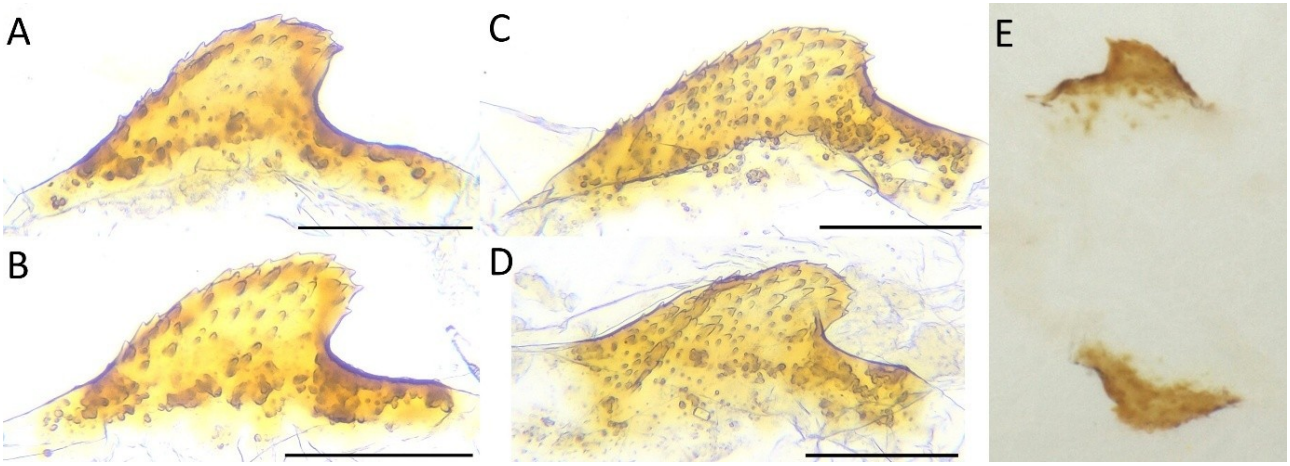

Fig. 4.- Sclerites in bursa copulatrix. **A.-** and **B.-** *Anthrenus (A.) buonpanei* Holloway & Rosenthal sp. nov., paratype female. **C.-** and **D.-** *Anthrenus (A.) corona* from Spain [RMNH]. **E.-** *Anthrenus (A.) corona* from Romania [NHMUK] (first shown in Pintilioaei *et al.*, 2025; no scale bar provided). Scale bars in Figs. A–D = 100 µm.

Description, internal characteristics (female). A pair of similar, pale brown, small, but obvious, bluntly hooked sclerites (Figs. 4A, B, approximately 250 µm long, 105 µm high) extending into bursa copulatrix. Sclerite margins and surfaces with small, sharp denticles.

Etymology. *Anthrenus buonpanei* is named after the collector of the type specimens, Pasquale Buonpane.

Differential diagnosis.

Anthrenus buonpanei is a 'giant' *A. pimpinellae* group species (Holloway, 2026a), so the obvious comparative species is *A. corona* (Fig. 5A) which has been described with morphometrics from Turkey (holotype Fig. 5A, BW/BL = 0.744, Holloway, 2021), Armenia (BW/BL = 0.72, Holloway *et al.*, 2025), Greece (BW/BL = 0.75, Holloway *et al.*, 2025), and Spain (BW/BL = 0.72, Holloway, 2025a).

The two *A. buonpanei* specimens described here are both narrower than the published BW/BL values of *A. corona*, averaging about 0.7 BW/BL, which might prove to be a useful guide, but more data are required for certainty. The antennal club of both male and female *A. buonpanei* are cubic, the width of antennomeres 9–11 are almost the same, whereas *A. corona* antennal club is cone-shaped (Fig. 5B), expanding in width from antennomere 9 to antennomere 11. The shape of the white elytral fascia is similar in both species. The examined type specimens of *A. buonpanei* appear to possess a slightly narrower elytral fascia than currently available specimens of *A. corona*, with more weakly connected sub-lateral patches (whereas several specimens of *A. corona* exhibit strongly connected sub-lateral patches). However, the intraspecific variability of both species requires further study as more material becomes available.

Anthrenus corona parameres (Fig. 5C) are narrower for the first 2/3, expand towards the apices, have widely spaced, strong setae along the outer margins, and smaller setae on the inner margins. *Anthrenus buonpanei* has broader parameres that barely expand towards the apices, have fine setae on the outer margins, and no setae on the inner margins. *Anthrenus corona* sternite IX (Fig. 5D) has a narrow, long posterior lobe with a convex posterior margin, whereas *A. buonpanei* sternite IX has a broader posterior lobe with a broad, flat posterior margin.

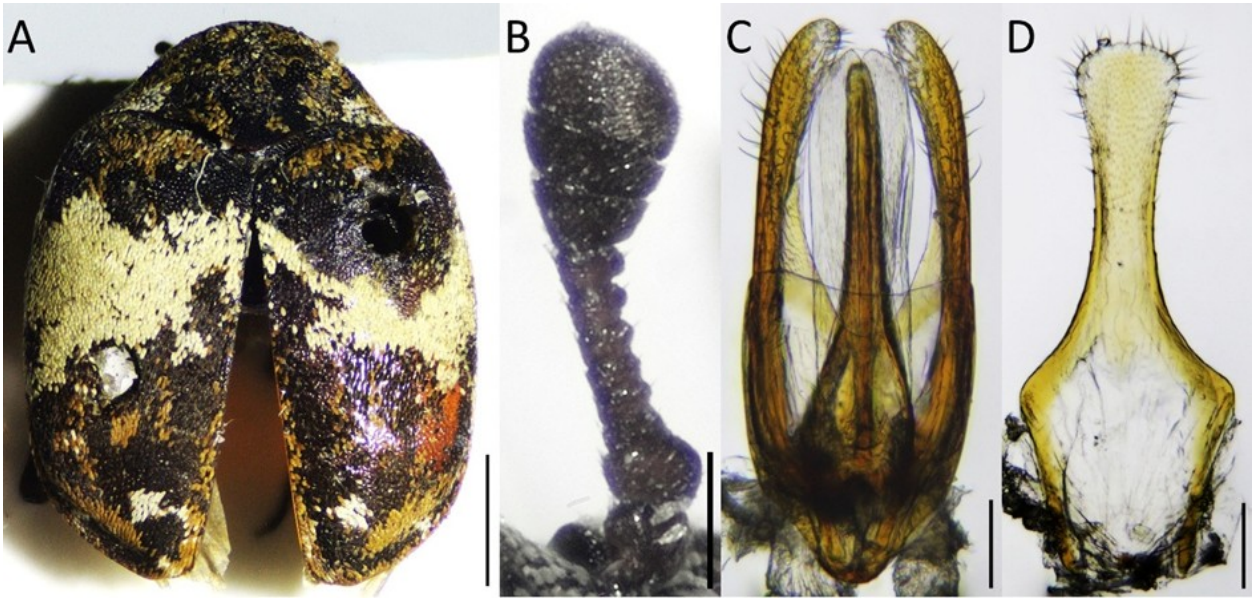

Fig. 5.- *Anthrenus (A.) corona* Holloway, 2021, holotype male [NHMUK]. **A.-** Habitus. **B.-** Antenna (scale bar = 100 µm). **C.-** aedeagus (scale bar = 100 µm). **D.-** Sternite IX (scale bar = 100 µm).

Female *A. buonpanei* have a pair of similar shaped and sized sclerites in the bursa copulatrix. This contrasts with the dissimilar sclerites in the bursa copulatrix of Spanish *A. corona* (Figs. 4C, D),

one sclerite is longer and shallower (approximately 290 x 70 µm) and unhooked, the other has similar dimensions to *A. buonpanei* but is more heavily hooked. As with *A. buonpanei*, the margins and surface are covered in sharp denticles. The sclerites in the bursa copulatrix of Romanian *A. corona* (Fig. 4E) are of low resolution, but appear also to be dissimilar in structure.

Distribution. *Anthrenus buonpanei* is only known from Italy (Fig. 6). *Anthrenus corona* records range from Spain in the west to Armenia in the east.

Fig. 6.- Distribution of published records of *Anthrenus (A.) corona* Holloway, 2021 and *Anthrenus (A.) buonpanei* Holloway & Rosenthal sp. nov.

Discussion

Anthrenus buonpanei differs from *A. corona* from eastern Europe in a variety of ways, so there is little doubt that *A. buonpanei* is a new species. Holloway (2025a) expressed surprise at finding *A. corona* in Spain. Finding *A. buonpanei* in Italy provided an opportunity to consider whether *A. buonpanei* also occurred in Spain, so a western and an eastern giant *A. pimpinellae* group species. Only females were found from Spain, but they had sclerites in the bursa copulatrix providing comparison with the female *A. buonpanei* from Italy. The Spanish and the Italian females are not the same: the Spanish females had two dissimilar shaped sclerites in the bursa copulatrix and the Italian female had two similar shaped sclerites in the bursa copulatrix. Pintilioaie *et al.* (2025) showed the sclerites in the bursa copulatrix from a Romanian female and those sclerites appeared to be dissimilar (although image resolution was low). Consequently, there is no evidence yet suggesting the Spanish specimens are not *A. corona*, but the Spanish sclerites do differ from the Italian sclerites, adding more evidence that *A. buonpanei* and *A. corona* are different species.

Sclerites in the bursa copulatrix in subgenus *Anthrenus* species are unusual. *Anthrenus muehlei* Holloway & Herrmann, 2024 also has a pair of small sclerites in the bursa copulatrix (Holloway & Herrmann, 2024b), but no other subgenus *Anthrenus* species have been found with sclerites in the bursa copulatrix. The sclerites are shown here at high magnification and high resolution allowing structural details to be examined for the first time. The *A. corona* and the *A. buonpanei* bursa copulatrix sclerites carry many sharp denticles over the surface and along the margins, suggesting the female plays an active role in the copulatory process by gripping some part of the aedeagus. The aedeagi of *A. corona* and *A. buonpanei* have unusually broad sperm ducts attached to the ventral surface of the median lobe, so it is possible that the female sclerites grip the sperm duct during copulation to hold the aedeagus in position.

Internal female structures are usually ignored in Dermestidae taxonomy. However, large and complex sclerites in the bursa copulatrix have been found in *Anthrenodes* Chobaut, 1898 species (Holloway, 2026b, c; Holloway & Pinniger, 2024), *Anthrenops* Reitter, 1881 species (Holloway, 2026d),

and simple sclerites in *Florilinus* Mulsant & Rey, 1868 (Adams, 1988). These female sclerites often vary greatly in structure among species so in some respects could be as useful as male structures in differentiating among species.

Anthrenus buonpanei constitutes the 37th *A. pimpinellae* group species (Holloway, 2026a). Nardi & Háva (2013) compiled a checklist of seven Italian *A. pimpinellae* group species, one of which was *A. goliath*, systematically confused through time with other species, such as *A. isabellinus*, and probably also, *A. corona* (Holloway, 2024b). For Italy, records of large specimens could easily relate to *A. buonpanei*. Published records of dissected *Anthrenus goliath* only come from Egypt (Holloway & Herrmann, 2024a). Holloway & Herrmann (2024c) described *A. valenzuelai* Holloway & Herrmann, 2024 from Sardinia, Italy. In addition, *Anthrenus pfefferi* Kalík, 1954 is said to be present in Italy (Háva, 2025; Háva & Herrmann, 2023), however it is not clear where the record is originally sourced from, since no previous article could be located containing specimen data for Italy. With *Anthrenus buonpanei*, the number of *A. pimpinellae* group species that are currently known from Italy, mostly with a reasonable level of certainty, is nine:

- *Anthrenus angustefasciatus* Ganglbauer, 1904
- *Anthrenus buonpanei* sp. nov.
- *Anthrenus delicatus* Kiesenwetter, 1851
- *Anthrenus isabellinus* Küster, 1848
- *Anthrenus mroczkowskii* Kalík, 1954
- *Anthrenus munroi* Hinton, 1943
- *Anthrenus pfefferi* Kalík, 1954
- *Anthrenus pimpinellae* (Fabricius, 1775)
- *Anthrenus valenzuelai* Holloway & Herrmann, 2024

Spanish *A. pimpinellae* group species have received more attention than Italian species, but the number of species definitively found in Spain currently stands at six:

- *Anthrenus amandae* Holloway, 2019
- *Anthrenus angustefasciatus* Ganglbauer, 1904
- *Anthrenus chikatunovi* Holloway, 2020
- *Anthrenus corona* Holloway, 2021
- *Anthrenus isabellinus* Küster, 1848
- *Anthrenus munroi* Hinton, 1943

Other *A. pimpinellae* group species are claimed from Spain in the *World Catalogue of the Dermestidae* (Háva, 2025) and erroneously in the checklist of Spanish Dermestidae (Holloway *et al.*, 2019) including *A. delicatus*, *A. goliath*, and *A. pimpinellae*. However, there are no authenticated records of *A. delicatus* in Spain, and evidence for the absence of *A. pimpinellae* from Spain has been published (Holloway *et al.*, 2023). There has also been a suggestion of *A. valenzuelai* in Spain (Háva, 2024), but this claim is shown to be unreliable (Holloway, 2024a). Additionally, *A. chikatunovi* is omitted from distributional records of Háva (2025) despite published evidence confirming its presence in Spain (Holloway, 2020, 2025b). This omission occurs because *A. chikatunovi* is repeatedly confused as a synonym of *A. isabellinus* in the *World Catalogue*, regardless of the strong evidence for its status as a valid species, as previously detailed by Holloway (2024b).

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