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ARTIGO / ARTÍCULO / ARTICLE
Differentiation of *Anthrenus isabellinus* Küster, 1848 from *Anthrenus chikatunovi* Holloway, 2020 (Coleoptera, Dermestidae, Megatominae)

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Abstract: *Anthrenus chikatunovi* Holloway, 2020 is frequently confused with *Anthrenus isabellinus* Küster, 1848 (Coleoptera, Dermestidae, Megatominae). This has led to two issues, namely whether *A. chikatunovi* is a valid species, and if so, how to differentiate between the two species. Images and measurements of the aedeagi are presented that clearly show differences between the species, removing any doubt that *A. chikatunovi* is a different and valid species. How to identify *A. chikatunovi* from images alone, and how to differentiate it from *A. isabellinus* is discussed. Distributions of the two species in the Iberian Peninsula are presented, indicating that overlap is currently only known to occur in the north-east of Spain.
Key words: Coleoptera, Dermestidae, *Anthrenus pimpinellae* complex, distribution, genitalia, dissection, aedeagus, antenna, habitus, colour pattern.

Resumen: Diferenciación de *Anthrenus isabellinus* Küster, 1848 de *Anthrenus chikatunovi* Holloway, 2020 (Coleoptera, Dermestidae, Megatominae). *Anthrenus chikatunovi* Holloway, 2020 es confundida frecuentemente con *Anthrenus isabellinus* Küster, 1848 (Coleoptera, Dermestidae, Megatominae). Esto ha derivado en dos problemas, a saber, si *A. chikatunovi* es una especie válida y, de serlo, cómo diferenciar las dos especies. Se presentan imágenes y medidas de los edeagos y antenas que claramente demuestran diferencias, eliminando cualquier duda sobre que *A. chikatunovi* sea una especie válida y diferente. Se discute sobre cómo identificar *A. chikatunovi* a partir sólo de imágenes y cómo diferenciarla de *A. isabellinus*. Se presentan las distribuciones de las dos especies en la Península Ibérica, constatando que actualmente su solapamiento sólo se produce en el noreste de España.
Palabras clave: Coleoptera, Dermestidae, complejo de *Anthrenus pimpinellae*, distribución, genitalia, disección, edeago, antena, habitus.

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Introduction

Anthrenus chikatunovi Holloway, 2020 (Coleoptera, Dermestidae, Megatominae) was described and compared principally with *A. pimpinellae* (Fabricius, 1775) due to size similarity and possession of a cubic antennal club (HOLLOWAY, 2020). It has been found subsequently that *A. pimpinellae* is unlikely to occur in Spain (HOLLOWAY *et al.*, 2023) and a proposal to remove *A. pimpinellae* from the Spanish checklist has been made (HOLLOWAY, 2024). Two issues have arisen relating to *A. chikatunovi*. The first concerns the status of *A. chikatunovi* as a valid species. Comparison of the new species (*A. chikatunovi*) with *A. isabellinus* Küster, 1848 was never carried out because the author considered *A. pimpinellae* to be the confusion species. That appears not to be the case and some workers claim that *A.*

chikatunovi and *A. isabellinus* are synonymous (J. Háva, pers. comm.; M. Geiser, pers. comm.). Indeed, *A. chikatunovi* appears in the World Catalogue of Dermestidae as a synonym of *A. isabellinus* (HÁVA, 2024) despite a lack of evidence being produced to support the position. Establishing the authenticity of species status for *A. chikatunovi* is important as HOLLOWAY (2024) has proposed that *A. chikatunovi* is one of only five *A. pimpinellae* complex species to be found in Spain. The other reason for exploring the situation further is that some citizen scientists apparently also find it difficult to tell the difference between *A. chikatunovi* and *A. isabellinus* under field conditions (INATURALIST, 2024).

The purpose of the current study is to:

- reiterate the internal features that define *A. chikatunovi* as a valid species and to compare with the equivalent features in *A. isabellinus*, and
- reiterate the external features that can be used by citizen scientists to differentiate between the two species from field-based images.

Materials and methods

Specimens of *A. chikatunovi* were borrowed from the Natural History Museum, London (NHML). Specimens of *A. isabellinus* were borrowed from NHML, and collected from the field, Mallorca. The process of dissection and imaging is described elsewhere (HOLLOWAY *et al.*, 2019, 2020; HOLLOWAY, 2020; HOLLOWAY & HERRMANN, 2024). Points for the distribution map (SHORTHOUSE, 2010) were derived from data associated with the study specimens and from INATURALIST (2024). Scale bars were attached using ImageJ (SCHNEIDER *et al.*, 2012).

Results

Internal features

Fig. 1 shows *A. chikatunovi* and *A. isabellinus* aedeagi, features usually examined to establish species status in *Anthrenus* Geoffroy, 1762.

Anthrenus chikatunovi (Fig. 1a)	*Anthrenus isabellinus* (Figs. 1b – 1e)
Parameres 384 µm long, splaying out from base with bowed outer margins and curving into blunt inward pointing apices. Inner margins of paddle-shaped posterior halves of parameres diverge and are densely coated in inward pointing sharp setae. Large white 'windows' from apices of parameres down through disc of paddles.	Parameres 542 µm long (mean length of aedeagi in Figs. 1b – 1e), parallel to each other for most of their length. Overall appearance of aedeagus long, narrow and oblong shaped. Tips of posterior paddles do not tilt in towards each other. Inner margins of paddles baring weaker setae that often point towards the apices of the parameres. Inner halves of paddles paler than the rest of the aedeagus.
Median lobe broad at base and steadily narrows for the first 3/4 to 4/5 of length and continues as a parallel sided finger terminating in a blunt, rounded tip.	Median lobe broad at base, almost parallel sided for the first 1/3. Beyond that, the margins steadily converge to a very thin, short terminal finger with a slight, but obvious, bulb like expansion at the very tip.

External features

Fig. 2 shows habiti (dorsal aspect) and antennae of *A. chikatunovi* and *A. isabellinus*, features that might be used by citizen scientists for identification.

Anthrenus chikatunovi (Figs. 2a and 2f)	*Anthrenus isabellinus* (Figs. 2b – 2e, 2g – 2j)
Body (Fig. 2a) length 2.85 - 3.11 mm. Narrow profile, body width/body length 0.66 – 0.68. White fascia narrow (see HOLLOWAY & CAÑADA LUNA, 2022, or HOLLOWAY, 2024, for how to measure relative fascia width).	Mean body (Figs. 2b – 2e) length 3.1 mm. Broad body profile with more rounded outer margins, mean body width/body length = 0.73 (HOLLOWAY *et al.*, 2020). White fascia broad (see HOLLOWAY & CAÑADA LUNA, 2022, or HOLLOWAY, 2024, for how to measure relative fascia width).
Antennal club (Fig. 2f) cubic with antennomere 9 only slightly narrower than antennomeres 10 and 11, with the latter two antennomeres equally broad.	Antennal club (Figs. 2g– 2j) narrower and teardrop shaped (especially in males, Figs. 2i and 2j) expanding in width from antennomere 9 to terminal antennomere.

Distribution

Fig. 3 shows the distributions of *A. chikatunovi* and *A. isabellinus* across the Iberian Peninsula.

Discussion

Examination of male genitalia is the usual approach taken to recognize new *Anthrenus* spp. In the current study, it is shown that the *A. chikatunovi* aedeagus is only 70% the length of *A. isabellinus* aedeagus and also differs in many other respects (Fig. 1). There are also large differences in sternite IX structure between the two species, but the substantial differences in aedeagal structure adequately differentiate between the species. However, images of sternite IX can be found for *A. chikatunovi* in HOLLOWAY (2020) and for *A. isabellinus* in HOLLOWAY & BAKALOUDIS (2019) and HOLLOWAY *et al.* (2019, 2020). Overall, the differences in genital structure leave little scope for confusion or lack of acceptance of *A. chikatunovi* as a valid species.

With significant contributions being made by citizen scientists to our understanding of the distribution of species (for example HOLLOWAY *et al.*, 2023), it is important to search for ways to differentiate among species using good images alone. HOLLOWAY & CAÑADA LUNA (2022) produce a key to identify most members of the *A. pimpinellae* complex in western Europe that includes both *A. chikatunovi* and *A. isabellinus*. *Anthrenus isabellinus* are often larger and broader than *A. chikatunovi* and these features alone often suffice to differentiate. Beyond that, the relative width of the white fascia is a good and generally reliable feature to confirm identification (HOLLOWAY & CAÑADA LUNA, 2022; HOLLOWAY, 2024). The structure of the antennal club is also a useful guide, although difficult to see clearly in many images taken under field conditions. *Anthrenus chikatunovi* has a cubic shaped club, which is typical for several of the smaller species of the *A. pimpinellae* complex, e.g., *A. pimpinellae* and *A. amandae* Holloway, 2019 (HOLLOWAY & BAKALOUDIS, 2020).

Anthrenus chikatunovi remains a poorly known species. The few reliable records indicate that it is mainly distributed across the very north-eastern regions of Spain (Fig. 3). More specimens need to be collected and dissected to confirm identity. *Anthrenus isabellinus* is much more widely distributed across the Iberian Peninsula, so differentiation between the two species considered here is only likely to be an issue in north-eastern Spain.

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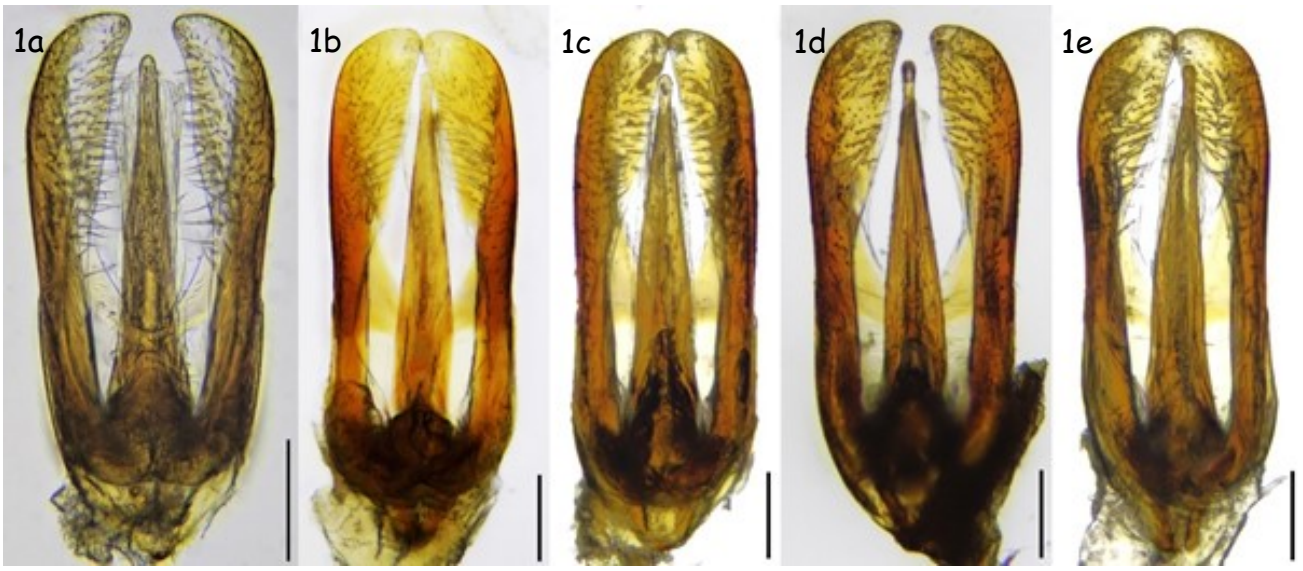

Fig. 1.– Aedeagi. **1a.-** *Anthrenus chikatunovi*. **1b–1e.-** *Anthrenus isabellinus*. Scale bars = 100 µm.

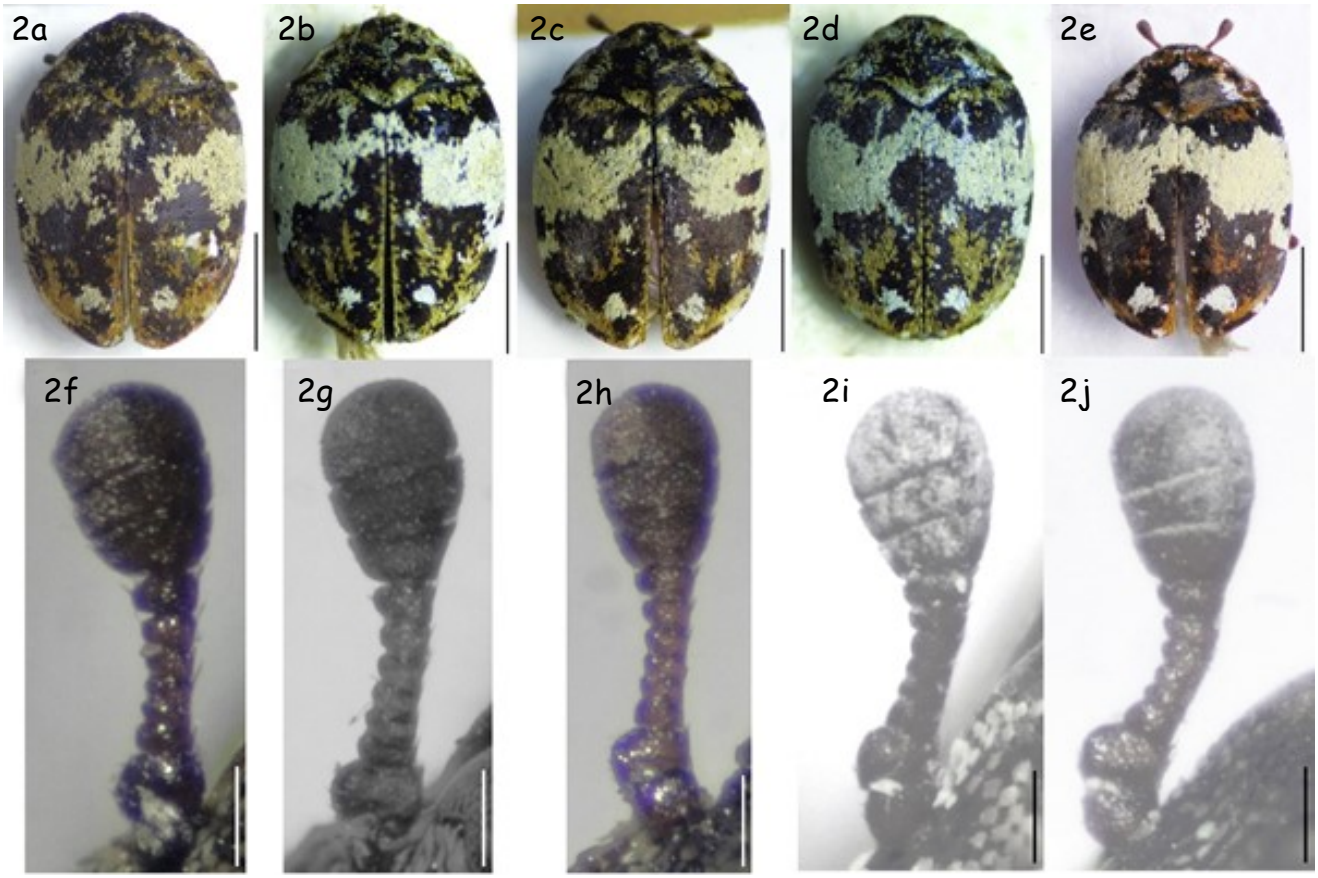

Fig. 2.– Habiti and antennae. **2a.-** *Anthrenus chikatunovi*. **2b–2e.-** *Anthrenus isabellinus*. Scale bars = 1 mm. **2f.-** *Anthrenus chikatunovi*. **2g–2h.-** *Anthrenus isabellinus*, female. **2i–2j.-** *Anthrenus isabellinus*, male. Scale bars = 100 µm.

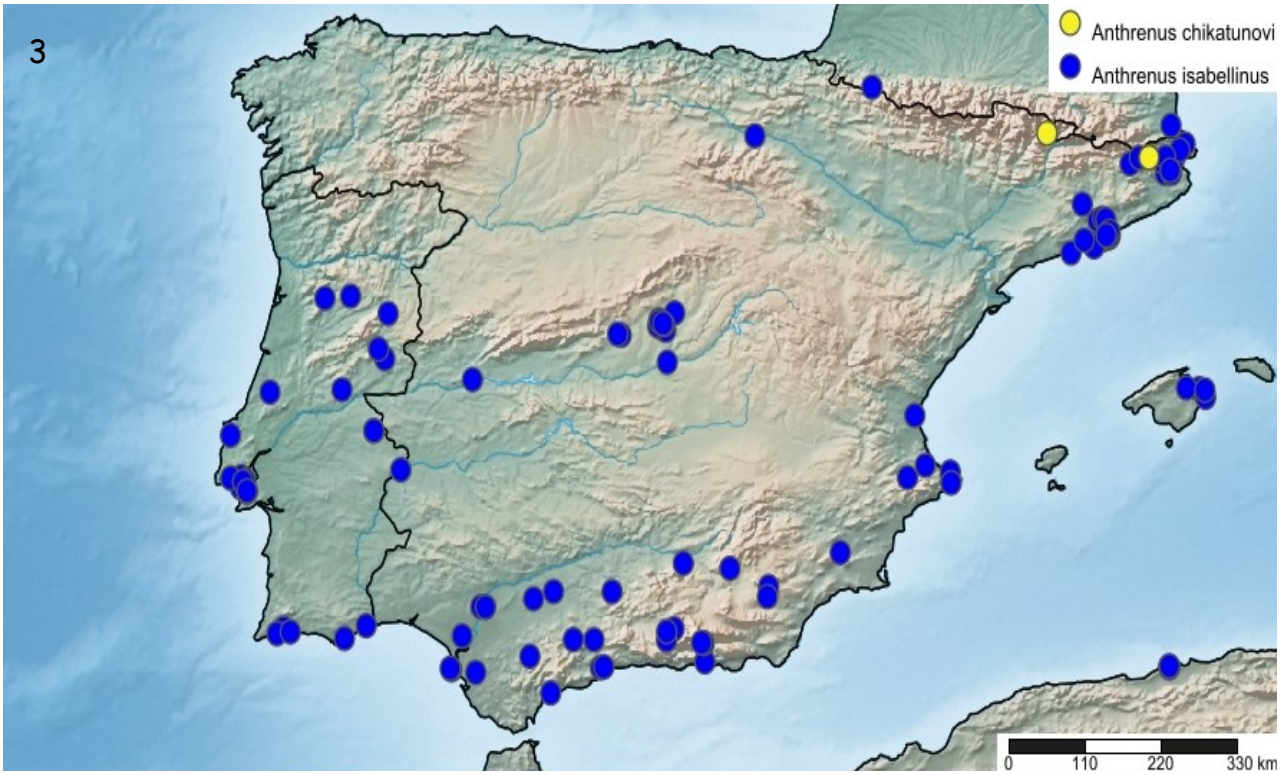

Fig. 3.– Distributions of *Anthrenus chikatunovi* and *Anthrenus isabellinus* across the Iberian Peninsula.