

*This contribution is published
to honor Prof. Vladimir Chikatunov,
a scientist, a colleague and a friend,
on the occasion of his 80th birthday.*

***Anthrenus* (s. str.) *chikatunovi* (Coleoptera: Dermestidae): A new species from southern France**

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ABSTRACT

A new species, *Anthrenus chikatunovi* n. sp. from southern France is described and illustrated. Externally, the species closely resembles *A. pimpinellae pimpinellae*. The main features distinguishing the new species from *A. p. pimpinellae*, and other potential confusion species, are on the genitalia.

KEYWORDS: Biodiversity, Coleoptera, Dermestidae, carpet beetles, *Anthrenus pimpinellae*, new species, taxonomy, genitalia, Palaearctic.

INTRODUCTION

The family Dermestidae is thought to harbour in excess of 1600 species worldwide (Háva 2015). Within the Dermestidae, the genus *Anthrenus* Geoffroy, 1762 contains well over 200 species, although the precise number remains unknown. Most workers split the genus *Anthrenus* into ten subgenera (Háva 2015) based on adult characteristics. Recent work on larval characteristics, however, suggests that only *Anthrenus* s. str. is monophyletic, with the rest of the subgenera forming a single polyphyletic group (Kadej 2018). *Anthrenus* (*Anthrenus*) *pimpinellae pimpinellae* Fabricius, 1775 has long been argued to be highly variable (Beal 1998). This level of variability has been a subject of discussion, and some workers speculated that the variation resulted from several species being considered together as a single species, in other words a species complex (e.g. Beal 1998). Later, Kadej *et al.* (2007) confirmed that this was the case and established that there were at least 17 Palaearctic species within the *A. pimpinellae* complex. This number was increased by a further three by Kadej and Háva (2011) and another one by Holloway (2019), bringing the number of Palaearctic species in the *A. pimpinellae* complex to 21. All this research has demonstrated how important it is to dissect specimens to inspect the genital structure. Whilst habitus and colour does vary within species to a degree (Holloway & Bakaloudis 2020), there is an overlap among some species making it sometimes difficult to establish which species is being considered (Kadej & Háva 2011). The

genitalia differ consistently among species making it a much more reliable route to establish identity (Kadej & Háva 2011; Holloway *et al.*, submitted).

A study was carried out on the specimens allocated to the *A. pimpinellae* draw in the Natural History Museum, London (NHM) prior to curation. The study involved dissecting every specimen to confirm identity. Several species within the *A. pimpinellae* complex were identified. Allocation of species to the *A. pimpinellae* complex is straight-forward. All members of the complex display a wide band of white or off-white broad, flattened scales across the width of the elytra. As Kadej and Háva (2011) note, the structure of this white band can be useful for species identification in some cases, but for other species identity is reliant on the structure of internal features, such as the genitalia. In the present paper, a species new to the *A. pimpinellae* complex is described and compared with possible confusion species.

MATERIALS AND METHODS

Over 100 specimens were borrowed from the NHM for the study. All individuals belonging to the *A. pimpinellae* complex were removed from their staging pins and placed into 2 % acetic acid for three days to soften them. After this period the insects fell away from the card on which they were set or were soft enough to enable them to be removed from the pin piercing the body. The abdomen was detached using entomological pins and the tergites were peeled away from the ventrites to facilitate removal of the genitalia. For male genitalia, sternite IX was detached from the aedeagus. The body, ventrites and tergites were re-carded. Where possible, at least one antenna was hooked out of the antennal cavity to facilitate inspection. The genitalia were set onto the card next to the body. Dissection was carried out under a Brunel BMSL zoom stereo LED microscope. Images were taken using a Canon EOS 1300D and fed through Helicon Focus 6-Pro focus stacking software to produce sharply focused images. Habitus images were captured at 20 \times , images of antennae were captured at 63 \times , and images of the genitalia were captured at 100 \times magnification. Morphometrics were taken using DsCap.Ink software.

The purpose of the exercise was to confirm identification of individuals prior to curation. Images of genitalia of *A. pimpinellae* from Kadej *et al.* (2007), Herrmann (2020), and Holloway and Bakaloudis (2020) were used to confirm identification. The following measurements were taken:

Body length (BL)	linear distance from anterior margin of pronotum to tip of elytra;
Body width (BW)	linear transverse distance from mid-point of outer margins of elytra (values were obtained for each elytron separately and then summed);
Paramere length (PL)	linear length of one paramere from apical tip to base where two parameres curve in to meet each other;
Antennal club length (AL)	maximum length of antennal club;
Antennal club width (AW)	maximum width of antennal club.

TAXONOMY

Genus *Anthrenus* Geoffroy, 1762*Anthrenus (Anthrenus) chikatunovi* n. sp.

(Figs 1A, 2A, 3A, 4A, 5A)

LSID: urn:lsid:zoobank.org:act:64E3B3FE-2DCB-4855-8C62-25217F926143.**Etymology:** *Anthrenus chikatunovi* is named in honour of Professor Vladimir Chikatunov for his curatorial work on the Coleoptera collection held by the Steinhardt Museum of Natural History, Tel Aviv University, and for his research into the Coleoptera of Israel.**Description:** Body short (BL = 2.85–3.11 mm) and narrowly oval (BW = 1.94–2.05 mm) (Fig. 1A). Cuticle dark brown. Upperparts covered in flat, broadly oval, overlapping scales. Individual scales either black or very dark brown, pale cream, or orange. Orange scales on pronotum concentrated on lateral margins and central posterior margin. Few cream coloured scales on pronotum, otherwise all scales dark. Cream scales on elytra concentrated in trans-elytral band. Band broadest at lateral margin becoming narrower toward elytral suture before turning upwards towards small black scutellum. One cream coloured pre-apical spot on each elytron. Eyes emarginated on inner edge and glabrous. Abdominal ventrites I–V covered in cream (sometimes tinted pale brown) scales, ventrite I slightly more sparsely covered with pale scales than ventrites II–V. Lateral margin of ventrites II–V plus tip of ventrite V with spots of dark scales, spots at lateral margins often flanked by a few orange scales. Spot of dark scales on ventrite I small and sub-lateral (Fig. 2A). Femora dark brown, slightly paler above, anterior face scaled. Tibiae and tarsi paler brown. Antenna with 11 antennomeres, antennomeres I–VIII reddish brown. Antennomeres**Fig. 1:** Habitus, dorsal view: (A) *Anthrenus* (s. str.) *chikatunovi* n. sp., paratype male; (B) *Anthrenus* s. str. *p. pimpinellae* (Fabricius); (C) *Anthrenus* (s. str.) *delicatus* (Kiesenwetter). Scale bars = 1 mm.

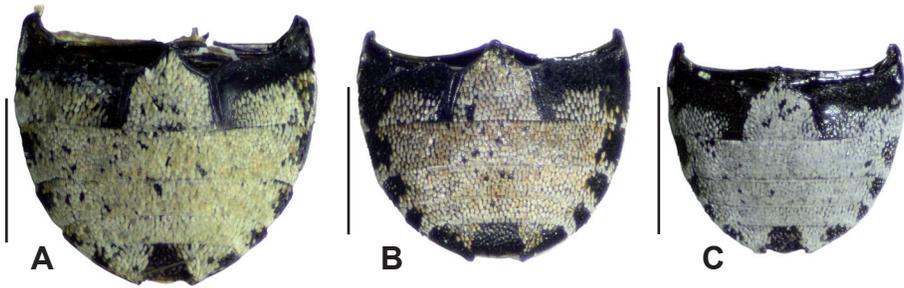


Fig. 2: Ventrites: (A) *Anthrenus* (s. str.) *chikatunovi* n. sp., paratype female; (B) *Anthrenus* (s. str.) *p. pimpinellae* (Fabricius); (C) *Anthrenus* (s. str.) *delicatus* (Kiesenwetter). Scale bars = 1 mm.

IX–XI forming broad, brown, slightly asymmetric club ($AL/AW = 1.24–1.29$). Length of terminal antennomere 0.4 length of antennomeres IX and X combined (Fig. 3A). Aedeagus short ($PL = 384$ and $410 \mu\text{m}$) relative to BL ($PL/BL = 0.131$ and 0.135) (Fig. 4A). Parameres, especially on dorsal surfaces, covered in long, spikey, inward pointing setae. Posterior halves of parameres expanded towards inward hooked tips. Inner halves of each of expanded parts of parameres membranous forming pale windows. Median lobe narrows from base ending in parallel-sided, finger-like terminal point which falls short of tips of parameres. Posterior stem of sternite IX with relatively narrow neck expanding to bulbous end (Fig. 5A). Terminal margin of posterior stem flat to shallow convex. Lateral margins carry

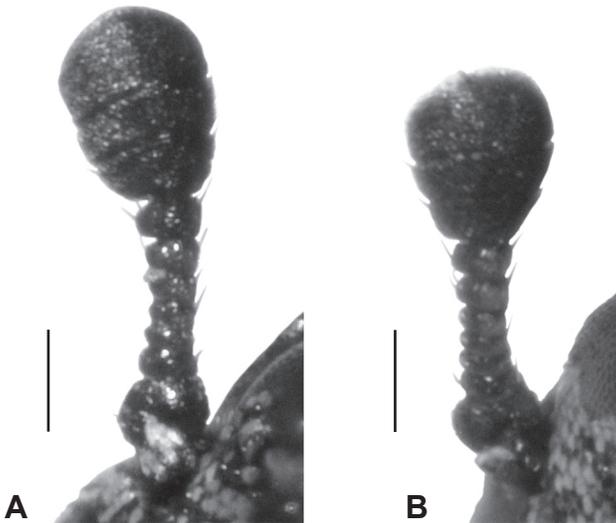


Fig. 3: Antenna: (A) *Anthrenus* (s. str.) *chikatunovi* n. sp., holotype male; (B) *Anthrenus* (s. str.) *delicatus* (Kiesenwetter). Scale bars = 0.1 mm.



Fig. 4: Aedeagus, dorsal view: (A) *Anthrenus* (s. str.) *chikatunovi* n. sp., paratype male; (B) *Anthrenus* (s. str.) *p. pimpinellae* (Fabricius); (C) *Anthrenus* (s. str.) *delicatus* (Kiesenwetter). Scale bars = 0.1 mm.

many sharp setae except for flat end of setae-free stem. Setae are longest on lateral margins of terminal bulb.

Differential diagnosis: *Anthrenus chikatunovi* is narrow (BW/BL~0.7). The other species within the *A. pimpinellae* complex that are similarly narrow include *A. amandae* Holloway, 2019 and *A. p. pimpinellae* (Holloway & Bakaloudis 2020). *Anthrenus amandae* is very dark, currently only known from Mallorca (Holloway 2019) and unlikely to be confused with *A. chikatunovi*. *Anthrenus p. pimpinellae* is, however, very similar in external appearance (Fig. 1B). Three specimens of *A. chikatunovi* are known offering limited information about colour pattern variation within the species, although one of the few papers considering *A. pimpinellae* patterns found very little intra-specific colour pattern variation (Holloway & Bakaloudis 2020). All three specimens have more orange scales on the dorsal surface than are found on most *A. p. pimpinellae*, particularly on the disk of each elytron behind the transverse pale band (Fig. 1A) (Holloway & Bakaloudis 2020). Typical *A. p. pimpinellae* have only a few scattered orange scales in this region of the elytra. On *A. chikatunovi*, the spots of black scales at the lateral margins of each ventrite are smaller than in *A. p. pimpinellae*. In particular, the spot of black scales at the lateral margin of ventrite I is small and sub-marginal in *A. chikatunovi* (Fig. 2A); in *A. p. pimpinellae* this spot of black scales is much larger, sits at the lateral margin and is not surrounded by white scales on its anterior side (Fig. 2B). The two paratypes were discovered through initial inspection of ventrite pattern.

Male genital structure differs most obviously between *A. chikatunovi* (Fig. 4A) and *A. p. pimpinellae* (Fig. 4B). The clearest differences in the parameres are as



Fig. 5: Sternite IX: (A) *Anthrenus* (s. str.) *chikatunovi* n. sp., holotype male; (B) *Anthrenus* (s. str.) *p. pimpinellae* (Fabricius). Scale bars = 0.1 mm.

follows (1) the expanded ‘paddles’ of *A. p. pimpinellae* parameres are broader than *A. chikatunovi* with obvious sigmoid internal margins; (2) the membranous windows on *A. p. pimpinellae* parameres are small and restricted to the tip of the hook whereas in *A. chikatunovi* they extend along the length of the inner half of the expanded portion of each paramere; (3) the expanded parts of the paramere in *A. p. pimpinellae* are extensively covered in long, backward facing shaggy hairs whereas in *A. chikatunovi* the hairs on the parameres are shorter, less extensive and point inwards. The median lobe in *A. p. pimpinellae* is very broad at its base and tapers gradually inwards to a slightly bulbous tip. The median lobe in *A. chikatunovi* is narrower, reaching its narrowest point about $\frac{4}{5}$ the way along and continues as an almost parallel-sided finger to a blunt tip with no expansion. There is much less difference between the narrowest and widest point on the posterior stem in *A. p. pimpinellae* sternite IX (Fig. 5B) than *A. chikatunovi*; in *A. pimpinellae* the stem is broad throughout. The lateral margins of sternite IX in *A. p. pimpinellae* carry long hairs, particularly the very long, slightly drooping hairs on the lateral margins of the bulbous tip. The lateral margin hairs on *A. chikatunovi* sternite IX are shorter throughout.

Another possible confusion species is *A. delicatus* Kiesenwetter, 1851. *Anthrenus delicatus* has even more orange scales on the elytra (Fig. 1C) loosely arranged in

stripes, a character used as an identification feature by Kadej (2005). The pattern of scales on the ventrites resembles *A. chikatunovi* (Fig. 2C), although the scales tend to be white rather than cream as in the three specimens of *A. chikatunovi* described here. Antennal structure in *A. delicatus* (Fig. 3B) is obviously different from *A. chikatunovi* being flat-topped and vase shaped. The aedeagus in *A. delicatus* differs in many obvious ways from *A. chikatunovi* (Fig. 4C).

Holotype: ♂ **France:** labelled 'Tarascon sur Ariège, Pyreneu. Southern France (42°84'57" N, 1°60'21" E), 21st May to 6th June 1950, altitude 490m asl, K. Jordan' (white handwritten) (NHM).

Paratypes: ♀ same data as holotype; ♂ labelled 'S. France, 99' (NHM).

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