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# Redescription of *Anthrenus* (*Florilinus*) *flavidus* and *Anthrenus* (*Florilinus*) *sveci* (Coleoptera: Dermestidae: Megatominae)

Graham J. Holloway[1]* & Andreas Herrmann[2]

[1]*Cole Museum of Zoology, School of Biological Sciences, HLS Building, Whiteknights, University of Reading, Reading, RG6 6UR, UK. E-mail: g.holloway@reading.ac.uk*
[2]*Bremervörder Strasse 123, 21682 Stade, Germany. E-mail: herrmann@coleopterologie.de*
**Corresponding author: g.holloway@reading.ac.uk*

**ABSTRACT**

Descriptions of many Dermestidae species are brief or lack images facilitating their identification or differentiation for the purpose of taxonomy. In the current study, two *Anthrenus* (*Florilinus*) species—*A.* (*F.*) *sveci* Háva, 2004 and *A.* (*F.*) *flavidus* Solsky, 1876—are considered, both from the Eastern Mediterranean region and both coated in pale scales. The external and internal features of both species are illustrated.

KEYWORDS: Biodiversity, carpet beetles, Eastern Mediterranean, genitalia, images, Palaearctic, skin beetles, taxonomy.

## INTRODUCTION

Accurate taxonomy and identification are predicated on detailed descriptions with clear images. The Dermestidae is approaching 2000 documented species (Háva 2025), including a large genus *Anthrenus* Geoffroy, 1762 with over 300 members. Many *Anthrenus* (indeed, Dermestidae in general) species were discovered and described a long time ago and, as a result, their accounts are brief and quite inadequate. It was often technically difficult if not impossible to produce images to illustrate the species at the time of their description. Therefore, it is important to redescribe such species and to supplement these redescriptions with high resolution images. For an amateur coleopterist wishing to identify Dermestidae in their collection, there are very few guides available for consultation, e.g. Peacock (1993) and Háva (2011). Beyond that, some Web sites provide excellent images of a range of species, the most exhaustive being Herrmann (2025). Taxonomic studies, however, require a level of detail beyond mere identification, often necessitating dissection and presentation of the genitalia images. When a new species is discovered, an opportunity arises for redescription of its insufficiently known congeners. Therefore, redescribing or, at least, emending descriptions of all species in need of attention is an enormous undertaking, yet it is as important as recognition of new taxa. As a bare minimum, description of each *Anthrenus* species should be associated with images of the habitus (dorsal and ventral aspect), antenna, aedeagus and sternite IX. Where females are available, they could be included; however, it is expected that *Anthrenus* species descriptions are predicated on the male genitalia, because these are sclerotized and more likely to survive a long period of preservation. A caveat

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to this point is that some *Anthrenus* species are known to have large sclerites in the bursa copulatrix (e.g., *A. sarnicus* Mroczkowski, 1963 and *A. bicolor* Holloway, 2026), which may be useful for species diagnoses (Holloway & Pinniger 2024; Holloway 2026). For male type specimens, all too often a description lacks one or more of the required elements either because they have not been included at all, such as the sternite IX, or because a schematic sketch of the aedeagus has been supplied rather than a high-quality image.

Providing good, useable descriptions for the majority of the Dermestidae species is a huge task, which will certainly entertain generations to come, yet the mammoth scale of this mission should not prevent a start from being made. The authors have made very modest inroads with enhanced accounts of *A. coloratus* Reitter, 1881, *A. flavipes* LeConte, 1854, *A. minor* Wollaston, 1865, *A. munroi* Hinton, 1943, *A. nipponensis* Kalík & Ohbayashi, 1985, *A. oceanicus* Fauvel, 1903, *A. pimpinellae* (Fabricius, 1775), *A. sarnicus* Mroczkowski, 1963, *A. sordidulus* Reitter, 1889, *Attagenus rufiventris* Pic, 1927, *Orphilus* Erichson, 1864 spp., *Trogoderma angustum* (Sollier in Gay, 1849) (Armstrong *et al*. 2023; Hermand & Holloway 2020; Holloway 2024; Holloway & Bakaloudis 2020; Holloway & Cañada Luna 2022; Holloway & Foster 2022; Holloway *et al*. 2024, 2025; Holloway & Herrmann 2024, 2026; Holloway & Pinniger 2024; Holloway & Sparks 2023).

In the current study, the identity of two pale-scaled *Anthrenus* (*Florilinus*) species, *A. sveci* Háva, 2004 and *A. flavidus* Solsky, 1876, both occurring in the Eastern Mediterranean, is clarified. The third Eastern Mediterranean species covered in pale scales, *A.* (*F.*) *sordidulus*, bearing yellow and orange scales spaced apart as in *A. sveci*, has recently been treated by Holloway and Herrmann (2026).

The description of the habitus of *Anthrenus sveci* was good, but not sufficiently illustrated: although sketches of the antenna and male genitalia were published, the sternite IX was not depicted, and no photographs were provided (Háva 2004). A quite similarly looking *Anthrenus flavidus* was described 150 years ago in Russian, and its original description was laconic and not accompanied by illustrations (Solsky 1876). Mroczkowski (1954) produced some beautiful and accurate drawings of *A. flavidus* when considering its phenotypic variation and Háva (2004) provided a sketch drawing of the male genitalia, but nowhere are photographs of *A. flavidus* available for scrutiny. Together with the detailed redescription of the external morphology, the recent study also provides new information on the internal structures of *A. flavidus* and *A. sveci*. The information presented here should facilitate the identification of pale-scaled *A.* (*Florilinus*) species from the Eastern Mediterranean.

## MATERIALS AND METHODS

The studied specimens were borrowed from the Naturalis Biodiversity Centre, Leiden, The Netherlands (RMNH) and the Natural History Museum, London (NHMUK). All specimens were macerated in 5% acetic acid for two days 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. The dorsal and ventral habitus images were captured at ×20 magnification using a Canon EOS 2000D camera mounted on the BMSL microscope, the image of the head was captured at ×63 magnification. The genitalia were photographed at ×200 magnification using a Canon EOS 1300D camera mounted on a Brunel monocular SP28 microscope. The aedeagus was suspended in glycerol for dorsolateral imaging. After dissection, all body parts were mounted on card using water soluble PVA glue. The antennae were teased out and images were taken at ×63 magnification through the BMSL microscope. All images were fed through Helicon Focus Pro version 8.2.2 focus-stacking software. Habitus measurements were made using a calibrated eyepiece, all other measurements were made and scale bars were added using ImageJ 1.53M (Schneider et al. 2012). The following measurements were taken: BL – body length from anterior margin of pronotum to apex of elytra, BW – body width (measured across both elytra), PL – distance from anterior end of parameres to apex of parameres, ML – distance from posterior tip of median lobe to tip of one anterior stirrup, SL – distance from tip of one anterior horn to tip of posterior lobe.

The distribution map was created using the SimpleMappr (Shorthouse 2010).

## TAXONOMY

Genus *Anthrenus* Geoffroy, 1762
Subgenus *Florilinus* Mulsant & Rey, 1868
*Anthrenus* (*Florilinus*) *sveci* Háva, 2004

Figs 1, 2

*Anthrenus* (*Florilinus*) *sveci* Háva, 2004: 1, figs 1–3.

**Redescription: Male.** Mean BL = 1.81 mm, mean BW/BL = 0.59. Integument of head and pronotum dark brown (Fig. 1A).


**Fig. 1.** *Anthrenus sveci* Háva, 2004: (A) head, scale bar = 0.1 mm; (B) habitus, dorsal, scale bar = 1 mm; (C) ventrites, scale bar = 0.5 mm.


**Fig. 2.** *Anthrenus sveci* Háva, 2004: (A) male antenna; (B) aedeagus, paratype; (C) sternite IX, paratype; all scale bars = 1 mm.

*Head* with single brown ocellus in centre of frons below level of top of eyes, inner margin of eyes complete. Back of vertex with small brown scales, brown scales extend down from centre of vertex as narrow line to ocellus. Rest of frons covered in well-spaced, non-overlapping yellow scales. Yellow scales of clypeus narrow, labrum red.

*Pronotum*: Anterior portion of pronotum with brown scales broader than scales on head, brown scales contiguous with brown scales on vertex. Posterior half of pronotum covered in yellow scales (with small number of admixed brown scales) reaching down to anterior corners along lateral margins.

*Scutellum* small, dark, triangular.

*Elytra*: Elytral integument brown (Fig. 1B), but strongly red around apices. Lateral margins not strongly convex. Surface covered in triangular yellow and brown scales often touching each other top and bottom but rarely laterally producing impression that scales spaced out. Sharp anterior attachment point of each scale easily visible. Yellow scales forming three poorly formed fasciae, sub-basal, sub-medial and pre-apical. Yellow scales reaching anteriad of sub-basal fascia and spreading along elytral base. Thin line of yellow scales along elytral suture, mostly brown scales between fasciae with occasional yellow scales.

*Ventrites* (Fig. 1C) uniformly covered in pale yellowish scales, same shape and spacing as dorsal scales.

*Antenna* (Fig. 2A) with eight antennomeres (typical for *A.* (*Florilinus*)). Antennomeres 1 and 2 (not shown) globular, yellow, antennomeres 3–5 cylindrical yellow, antennomere 6 trapezoid yellow basally dark brown apically, antennomeres 7 and 8 hirsute, dark brown forming slim club, terminal antennomere 4× as long as penultimate antennomere. Háva (2004) indicated differences between male and female antennae.

*Legs* entirely pale brown, with pale scales on ventral surface of femora.

*Aedeagus* (Fig. 2B) sclerotized. Parameres (PL = 230 µm) diverge from base for ¾ length before curving smoothly inwards towards bluntly pointed apices. Inner paramere margins converge to bridge at aedeagus midpoint. Inner surface of parameres with some long, inward pointing, straight setae, longest at paramere apices. Median lobe (ML = 164 µm) slim, lateral margins converging only slightly from base to tip, lobe curved dorsally. Base of median lobe with two narrow, straight, diverging stirrups.

*Sternite IX* (SL = 265 µm, Fig. 2C) rectangular, evenly convex posterior margin, two convergent basal attachment horns. Base and disc of sternite IX pale brown, lateral and posterior margins pale. Short setae emerge from pale tissue surface, many short erect setae line posterior margin.

**Material examined: Greece:** 4♂, Peloponnesus, Kardamyli, 36.887°N 22.232°E, 26.v.2003 (RMNH.INS.1492036, INS.1492042, INS.1492045, INS.1492158); 1♂, same location, 30.v–2.vi.2001, J.E. & S. Oude (RMNH.INS.1492024); 1♂, Isle of Samos, Kampos (Votsalakia), 37.709°N 26.673°E, 2.vi.2003 (RNHM.INS.1492133); 1♂, same location, 2.vi.2007, J.E. & S. Oude (RNHM.INS.1492156); 1♂, Peloponnesus, Saidona, 36.883°N 22.284°E, 7.vi.2002, J.E. & S. Oude (RNHM.INS.1492134); 1♂ paratype, Mount Olympus, 40.084°N 22.350°E, 6.vi.1999, Z. Svec (NHMUK).

**Distribution:** Greece, Cyprus and Turkey (Háva 2025) (Fig. 5).

## *Anthrenus* (*Florilinus*) *flavidus* Solsky, 1876

Figs 3, 4

*Anthrenus* (*Florilinus*) *flavidus* Solsky, 1876: 281, pl. 1, fig. 14; Mroczkowski 1954: 1, figs 1–7, 11; Sokolov 1974: figs 10–13; Háva 2004: 4, figs 5–8.

**Redescription:** Mean male BL = 2.29 mm, BW/BL = 0.55; mean female BL = 2.77 mm, BW/BL = 0.597. Integument of head and pronotum dark brown (Fig. 3A).

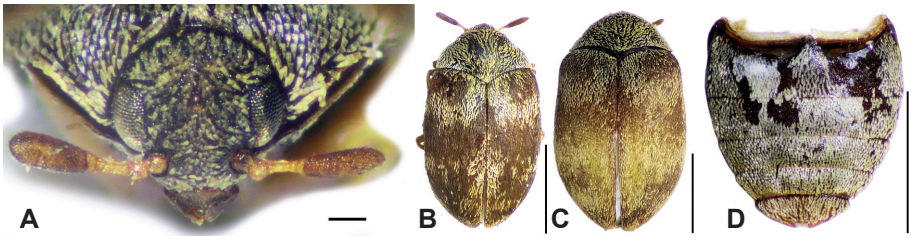


**Fig. 3.** *Anthrenus flavidus* Solsky, 1876: (A) head, scale bar = 0.1 mm; (B, C) male and female habitus, scale bars = 1 mm; (D) ventrites, scale bar = 1 mm.

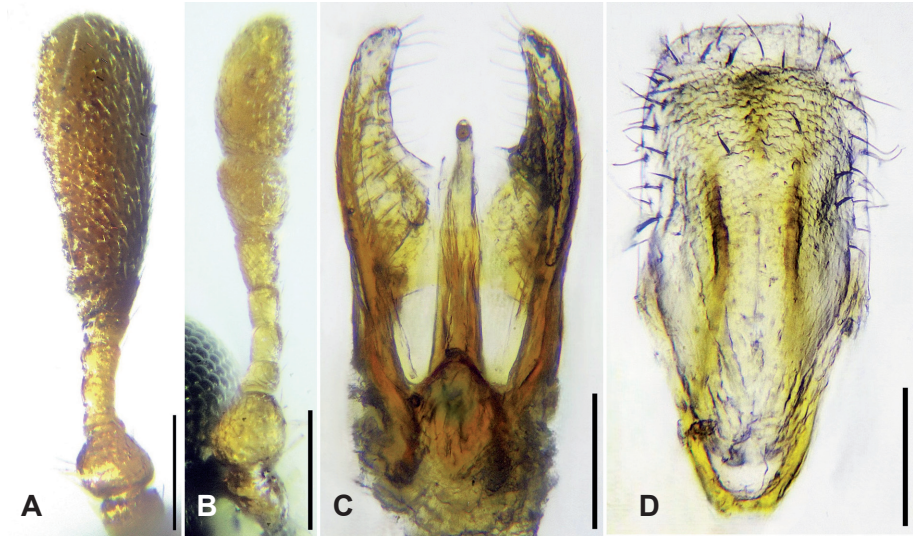


**Fig. 4.** *Anthrenus flavidus* Solsky, 1876: (A) male antenna; (B) female antenna; (C) aedeagus; (D) sternite IX. All scale bars = 100 μm.

*Head* with single amber coloured ocellus in centre of face below level of top of eyes, inner margin of eyes complete. Vertex with yellow scales, browner scales along front edge of vertex down to ocellus, rest of face with yellow scales. Labrum dark orange.

*Pronotum* evenly covered in yellow scales (Figs 3A–C).

*Elytra*: Elytral integument brown (males), becoming pale red towards apices (females). Surface covered in triangular yellow and brown scales, narrower and more densely packed than *A. sveci*. Yellow scales forming three fasciae, sub-basal, sub-medial and pre-apical. Yellow scales reaching anteriad from sub-basal fascia and spreading along elytral base. Thin line of yellow scales along elytral suture, mostly brown scales between fasciae with occasional yellow scales. Elytra covered in elongated triangular, overlapping or at least abutting yellow and brown scales. Yellow scales arranged in three broad fasciae. Sub-basal fascia crosses elytra from lateral margins, yellow scales sweep up towards small dark triangular scutellar shield before meeting elytral suture, then spread along elytral base from scutellar shield towards lateral margin. Sub-medial fascia straight from lateral margin to elytral suture, yellow scales spread down elytral suture then back towards lateral margin forming pre-apical fascia. Brown scales with occasional yellow scales between fasciae. Female pattern like male but paler integument shows through scales (Fig. 3C).

*Ventrites*: (Fig. 3D) integument brown, red at apex, densely covered in pale yellowish scales.

*Antenna* (Fig. 4A, 4B) with eight antennomeres, male antennae (Fig. 4A) orange with darker club. Antennomeres 1 and 2 globular, antennomere 3 transverse,

antennomeres 4 and 5 square to transverse, antennomere 6 dark across apical margin, transverse, antennomeres 7 and 8 forming slim club, antennomere 8 5–6× as long as than antennomere 7. Female antenna (Fig. 4B) yellower, antennomeres 4–6 elongate, antennomere 8 twice as long as antennomere 7.

*Legs* red brown, pale scales on ventral surface of femora.

*Aedeagus* sclerotized (Fig. 4C) elongate, considerably longer than in *A. sveci* (Fig. 2B). Parameres (PL = 335 µm) diverge from base for about ⅔ length before curving inwards slightly at apices. Bridge well above midpoint. Inner surface of parameres with some long, inward pointing, straight setae, longest at paramere apices. Median lobe (ML = 290 µm) slim, long, lateral margins converging only slightly from base to slim tip, lobe curved dorsally.

*Sternite IX* (SL = 356 µm, Fig. 4D) rectangular, flat posterior margin, lateral margins in anterior half consist of thickened rods that join at base. Base of sternite IX pale brown, posterior disc reticulated pale brown, mid-disc with two more heavily sclerotized vertical stripes. Lateral and posterior margins pale. Short, strong sub-marginal setae emerge from pale tissue surface, two strong setae emerge from reticulated disc, lateral marginal setae finer. Posterior margin largely devoid of setae.

*Bursa copulatrix* with four strip-like sclerites.

**Material examined: Poland:** 4♂ 3♀, Warsaw, Museum of Zoology of the Polish Academy of Sciences, 6.vi.1952, M. Mroczkowski, from culture (NHMUK).

**Distribution:** Naturally distributed on Cyprus, in Turkey, Caucasus, Middle Asia and Central Asia; introduced in Austria, Germany and Poland (Háva 2025) (Fig. 5).

**Note:** The drawing of the *A. flavidus* aedeagus by Sokolov (1974) shows no setae, being otherwise reasonably accurate.

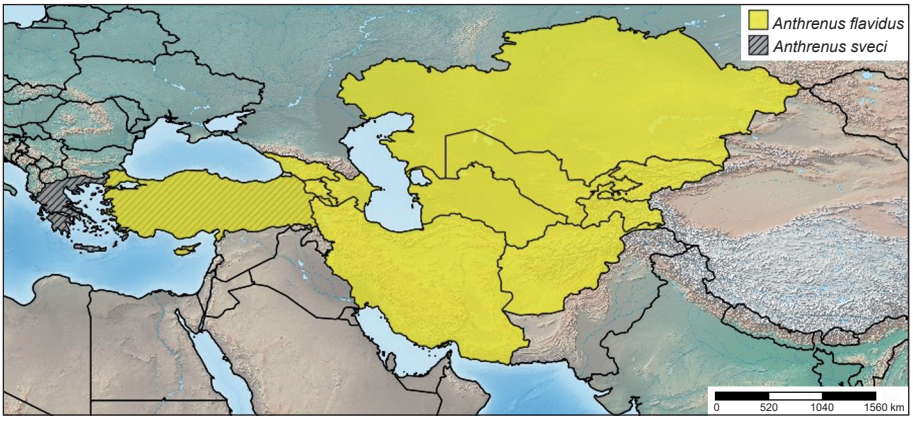


**Fig. 5.** Distributions of *Anthrenus sveci* Háva, 2004 and *Anthrenus flavidus* Solsky, 1876 according to Háva (2025); the records from the European countries where *A. flavidus* is thought to be introduced are omitted.

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