Four new species of subgenus Anthrenodes Chobaut (Coleoptera: Dermestidae: Megatominae: Anthrenus Geoffroy) from Jordan

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Four new species of subgenus *Anthrenodes* Chobaut (Coleoptera: Dermestidae: Megatominae: *Anthrenus* Geoffroy) from Jordan

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Abstract. Four **new species**: *Anthrenus* (*Anthrenodes*) *prietoi*, *Anthrenus* (*Anthrenodes*) *vorsti*, *Anthrenus* (*Anthrenodes*) *faillei*, and *Anthrenus* (*Anthrenodes*) *tenebrosus* (Coleoptera: Dermestidae: Megatominae) are described from Jordan and compared with other *Anthrenodes* Chobaut species from Jordan and surrounding region. Images of habitus and genital characteristics are provided.

Key words. *bicolor*, dissection, *malkini*, *pica*, *pulchellus*, *translucens*, identification, taxonomy.

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Introduction

The family Dermestidae (Coleoptera) contains nearly 2000 species (Háva 2025). Within this family sits the large genus *Anthrenus* Geoffroy, 1762 with about 330 species currently named (Háva 2025). *Anthrenus* is split into 10 subgenera (Peacock 1993; Háva 2004) one of which is *Anthrenodes* Chobaut, 1898. The subgenus has received much attention in the last 20 years. Only 12 *Anthrenodes* species were known before the year 2000, but the number of *Anthrenodes* species now stands at over 40 (Háva 2025). Mostly single species have been added to the list with only a few studies focusing on multiple *Anthrenodes* species from a particular region, including Kadej and Háva (2006) and Holloway (2025). Here an opportunity arose to study a substantial sample of *Anthrenodes* specimens from Jordan enabling more than a single species to be considered. At the time of writing, two *Anthrenodes* species are definitively known from Jordan: *A. bicolor* Holloway, 2026 and *A. jordanicus* Pic, 1934. The current study describes four new *Anthrenodes* species and extends our knowledge of *Anthrenodes* species in the Middle East.

Materials and Methods

Specimens were obtained for study from Staatliches Museum für Naturkunde, Stuttgart, Germany and Naturalis Biodiversity Centre, Leiden, The Netherlands and relaxed 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. 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 and head view captured at ×63 using a Canon EOS 2000D camera mounted on the BMSL microscope. Images of aedeagi, sternite IX, antennae, and bursa copulatrix sclerites were captured at ×200 magnification using a Canon EOS 1300D camera mounted on a Brunel monocular SP28 microscope. All images were fed through Helicon Focus Pro version 8.2.2 focus-stacking software. 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

Distribution maps were created using SimpleMappr (Shorthouse 2010). Scale bars were added using ImageJ 1.53M. Additional material was examined from the following institutions: **AHEC** = Andreas Herrmann's Entomology Collection, Stade, Germany. **NHMUK** = Natural History Museum, London, England. **RMNH** = Naturalis Biodiversity Centre, Leiden, The Netherlands. **SMNS** = Staatliches Museum für Naturkunde, Stuttgart, Germany.

Taxonomy

Dermestidae Latreille, 1803
Megatominae Leach, 1815
Anthrenini Gistel, 1848
Anthrenina Gistel, 1848
Anthrenus Geoffroy, 1762
Anthrenodes Chobaut, 1898

***Anthrenus* (*Anthrenodes*) *prietoi* Holloway, new species**

(Fig. 1–3)

Type specimens. Holotype male. Jordan, Beida (4kms north of Petra) (30.384, 35.473), 25.vii.1985, Ph. Pronk leg. (RMNH, catalogue number RMNH.INS.1492161).

Paratypes. Two males (catalogue numbers RMNH.INS.1492173 and 1492185) and five females, same data as holotype: (two females (catalogue numbers RMNH.INS.492160 and 1492174) RMNH; one female (catalogue number RMNH.INS.1492162) NHMUK; one female (catalogue number RMNH.INS.1492178) SMNS; one female (catalogue number RMNH.INS.1492182) AHEC.

Description, external characteristics. Narrow, mean male BL = 2.2 mm, BW = 1.37 mm, BW/BL = 0.62; mean female BL = 2.27 mm, BW = 1.42 mm, BW/BL = 0.62. Single brown ocellus below level of top of eyes, no notch on inner eye margin (Fig. 1A). Integument of head and pronotum dark brown/black. Vertex with small, brown, overlapping scales, towards outer edges of vertex scales paler. Scales around ocellus paler brown, rest of face down to and including clypeus with white scales. Labrum red. Outer thirds of pronotum (Fig. 1A) with large, white, broad oval scales. Middle third of pronotum with brown scales contiguous with brown scales on vertex. Some pale orange scales at interface between white and brown scales. Narrow band of orange scales across patch of brown scales on pronotum in front of scutellar shield. Scutellar shield small, triangular, blackish. Elytral integument (Fig. 1B) dark brown across base and short way down elytral suture. Rest of elytral integument deep orange-red.

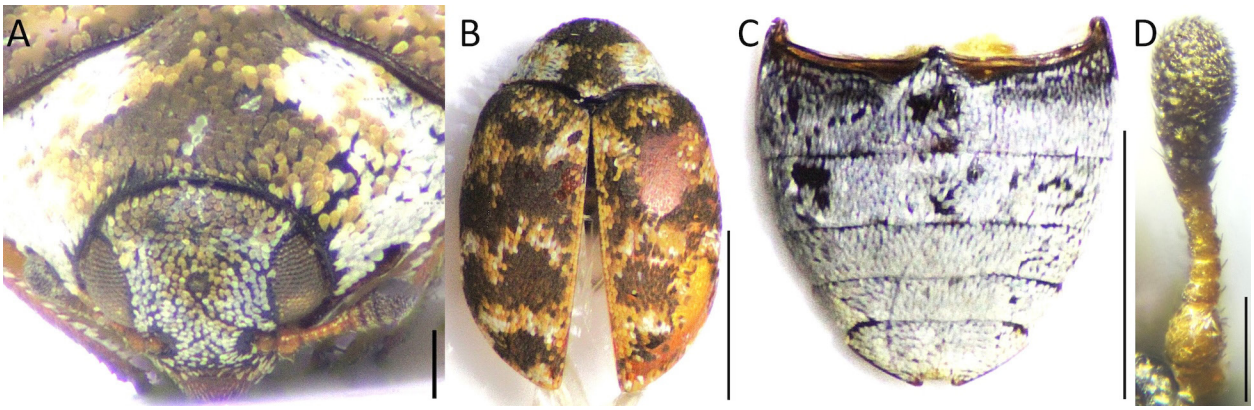

Figure 1. *Anthrenus prietoi* Holloway **sp. nov. A)** Head female paratype (scale bar = 100 μm). **B)** Habitus female paratype (Scale bar = 1 mm). **C)** Ventrites female paratype (scale bar = 1 mm). **D)** Antenna male holotype (scale bar = 100 μm).

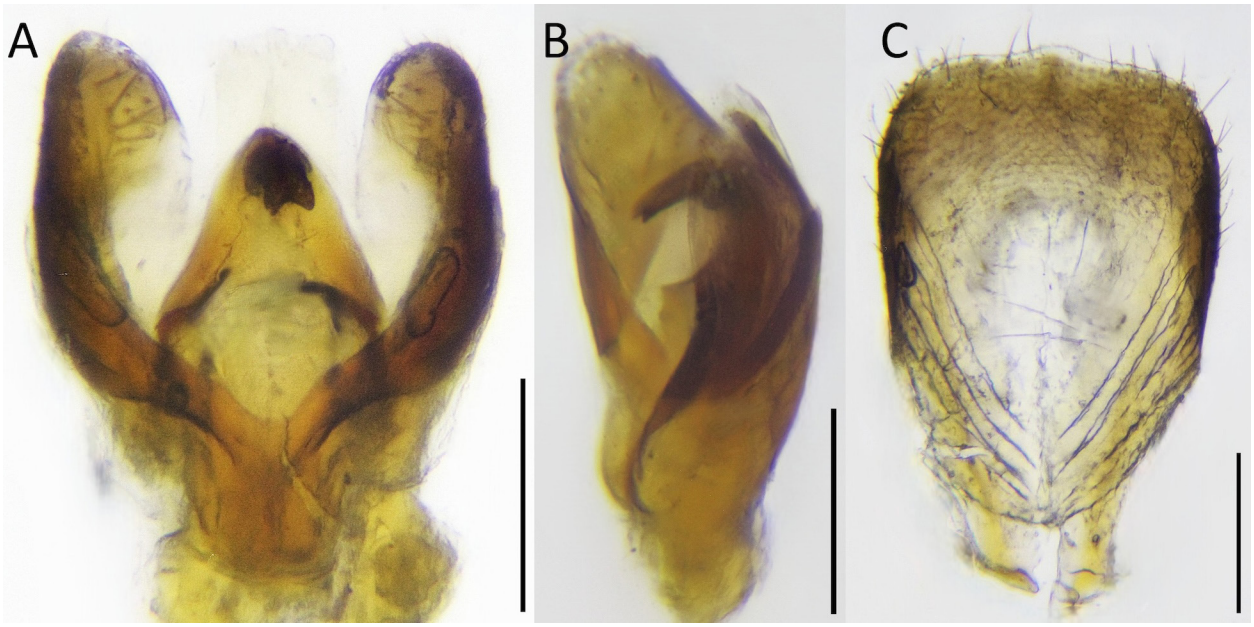

Figure 2. *Anthrenus prietoi* Holloway **sp. nov.** holotype male. **A)** Aedeagus dorsal aspect. **B)** Aedeagus dorsolateral aspect. **C)** Sternite IX. All scale bars = 100 μm.

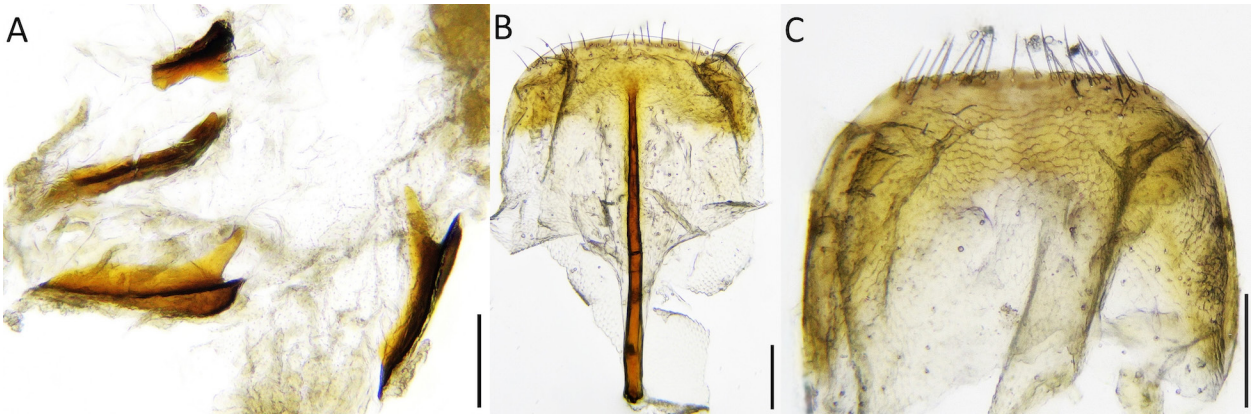

Figure 3. *Anthrenus prietoi* Holloway **sp. nov.** paratype female. **A)** Sclerites in bursa copulatrix. **B)** Sternite VIII. **C)** Tergite VIII. All scale bars = 100 μm.

Three narrow fasciae cross elytra, sub-basal, sub-medial, and sub-apical. Sub-basal fascia broad at lateral margin, narrow from middle to elytral suture and consisting of orange, pale brown and white overlapping scales, and reaching up to scutellar shield close to elytral suture. Sub-medial fascia narrow, sinuate with same range of scale colors. Sub-apical fascia narrow, straight with same range of scale colors. Orange/pale brown scales line elytral suture. Apical spot of orange/pale brown/white scales. Patch of orange/pale brown/white scales just sub elytral base. Elytral base with dark brown scales. Rest of elytra covered in dark brown scales.

Ventrites (Fig. 1C) with black integument, covered in white/cream scales, slightly yellowish at lateral margins of ventrites 4 and 5. Antenna with ten antennomeres (Fig. 1D). Antennomeres 1–7 red, antennomeres 8–10 reddish-brown and expanding from antennomere 8 to form hirsute club. Terminal antennomere rounded. Legs red.

Description, internal characteristics (males). Aedeagus (Fig. 2A, B) small, squat, almost broad as long. Parameres (PL = 230 μm) brown, join forming a central peg pointing anteriad. Parameres sinuate from base, diverge

rapidly, expanding and turning posteriad from about halfway. Outer margins of parameres slightly convex, posterior tips broad, rounded, with some long setae on posterior face. Tip of parameres and lower internal margins pale. Median lobe (ML = 187 μm) triangular, broad at base, narrowing to hooked apex, outer margins almost straight. Sperm duct extends beyond tip of median lobe to tips of parameres (Fig. 2A). Tip of median lobe dark brown, bifurcated, strongly hooked dorsally (Fig. 2B). Tooth on ventral surface of median lobe towards base (Fig. 2B). Sternite IX (Fig. 2C, SL = 360 μm) longer than aedeagus. Sternite IX tricolored, posterior section and lateral margins brown, disk white, rest of sternite pale brown. Posterior margin white, flat apart from small projection in middle. Regularly spaced setae line posterior margin and halfway down lateral margins.

Description, internal characteristics (females). Bursa copulatrix with four large sclerites (Fig. 3A). All four with dark brown, elongated bases which fix each sclerite to inner wall of bursa copulatrix. Long, narrow, angled, pale brown tooth sitting on top of base towards one end. Sternite VIII (Fig. 3B) umbrella-shaped with broad, pale brown posterior lobe. Posterior margin white with a row of evenly spaced, sub-marginal setae. Anterior stem long, darker brown, expanding anteriad, fixed to lower disc of posterior lobe. Tergite VIII (Fig. 3C) with flat posterior margin lined with long inward angled, straight setae. Tergite VIII brown, deep, straight lateral margins that follow smooth long curves to join posterior margin. Tergite VIII disc reticulated, anterior margin with inverted V-shape.

Etymology. The species is named in honour of Fernando Prieto Piloña, who volunteers his time to efficiently produce the excellent Spanish entomology journal Arquivos Entomoloxicos.

Differential diagnosis. The only Jordanian *Anthrenodes* species with bright orange scales on red elytral integument is *A. bicolor* (Fig. 4), and looking further afield in the Arabian Peninsula, another species like *A. prietoi* is *A.* (*Anthrenodes*) *pulchellus* Gestro, 1889 (Herrmann 2025; Fig. 5). *Anthrenus bicolor* is largely orange with whitish fasciae (Fig. 4A). The median lobe is narrower than *A. prietoi* with a simple (rather than a bifurcated) tip (Fig. 4B). The bursa copulatrix has four sclerites like *A. prietoi* but are structurally very different (Holloway 2026; Fig. 4C). *Anthrenus pulchellus* has white, orange and brown scales like *A. prietoi* but the basal third of the elytra in *A. pulchellus* has mostly white scale whereas *A. prietoi* elytral base region is dominated with brown (dark and light) and orange scales (Fig. 5A). *Anthrenus prietoi* elytral fasciae obvious against the dark brown background, but only sub-medial fascia in *A. pulchellus* is evident. Only terminal antennomere in *A. pulchellus* (Fig. 5B) looks dark against the red coloration of the remaining antennomeres. In *A. prietoi*, antennomeres 8–10 are dark. *Anthrenus pulchellus* aedeagus (Fig. 5C) is also short and squat, but parameres are narrower than *A. prietoi* and pointed more posteriorly.

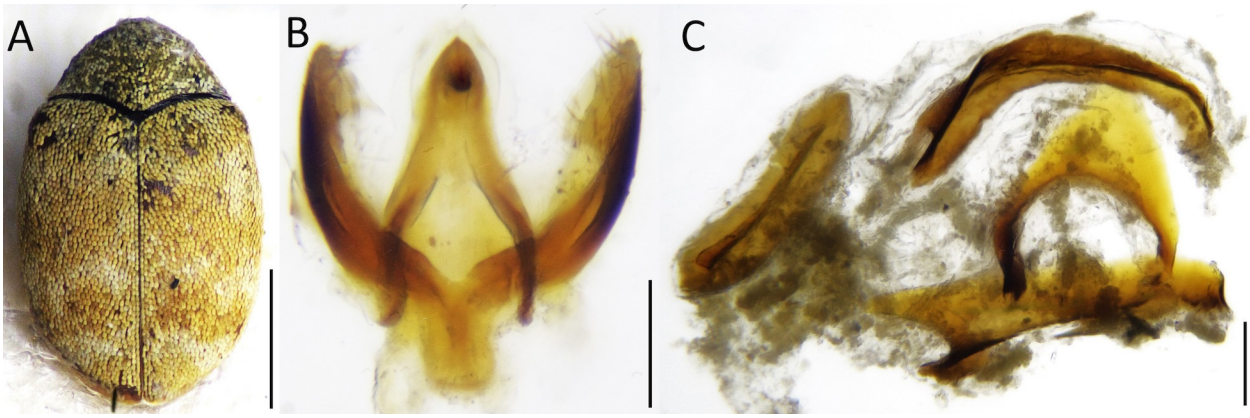

Figure 4. *Anthrenus bicolor* Holloway, 2026. **A)** Habitus (scale bar = 1 mm). **B)** Aedeagus (scale bar = 100 μm). **C)** Sclerites in bursa copulatrix (scale bar = 100 μm).

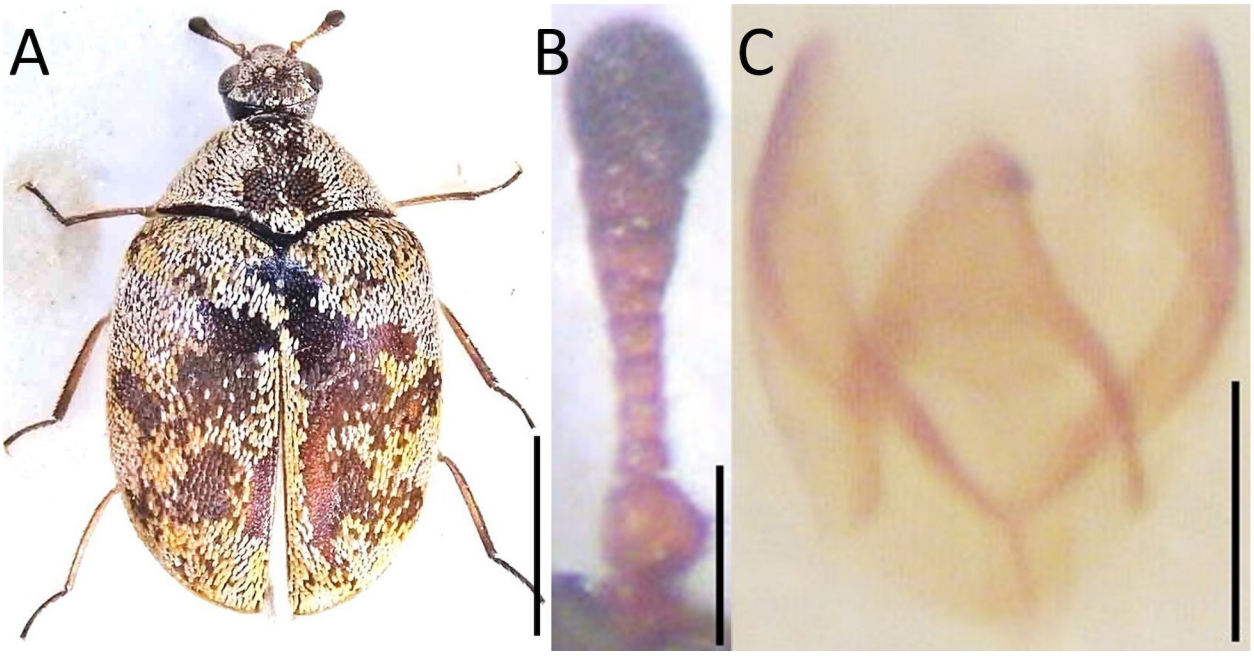

Figure 5. *Anthrenus pulchellus* Gestro, 1889, AHEC. **A)** Habitus (scale bar = 1 mm). **B)** Antenna male (scale bar = 100 µm). **C)** Aedeagus (scale bar = 100 µm).

Anthrenus (*Anthrenodes*) *vorsti* Holloway, new species

(Fig. 6–7)

Type specimens. Holotype male. Jordan, Beida (4kms north of Petra) (30.384, 35.473), 25.vii.1985, Ph. Pronk leg. (RMNH, catalogue number RMNH.INS.1492167)

Paratypes. Two males (RMNH, catalogue numbers RMNH.INS.1492165 and 1492168) and seven females (RMNH, catalogue numbers RMNH.INS.1492113, 1492169, 1492170, 1492177, 1492179, 1492180, 1492183) same data as holotype, Ph. Pronk leg.; 11 males and 11 females Jordan, Petra, 400m, (30.325, 35.451), 21.viii.1967, J. Klapperich, leg.: one male, one female (NHMUK), one male, one female (RMNH), one male, one female (AHEC), eight males, eight females (SMNS); one male Jordan, Schaubak (30.518, 35.557), 25.vii.1968, J. Klapperich, leg. (SMNS); one male, Jordan, JISA [Jordan International Solidarity Academy] (32.029, 35.857), 7.viii.1964, J. Klapperich, leg. (SMNS); one female, Jordan, Jordan Valley at Dead Sea, 380m, 10.v.1963, J. Klapperich, leg. (SMNS).

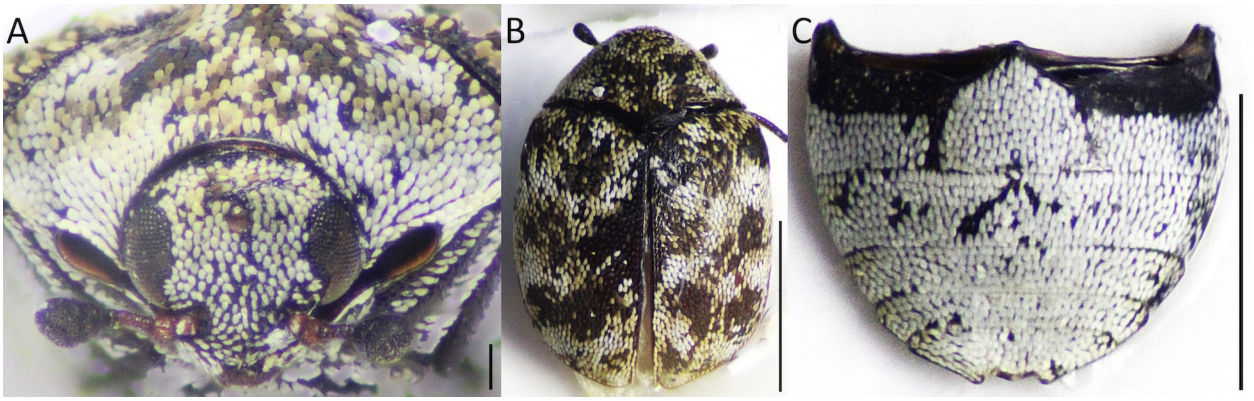

Figure 6. *Anthrenus vorsti* Holloway **sp. nov.** holotype male. **A)** Head (scale bar = 100 µm). **B)** Habitus (scale bar = 1 mm). **C)** Ventrites (scale bar = 1 mm).

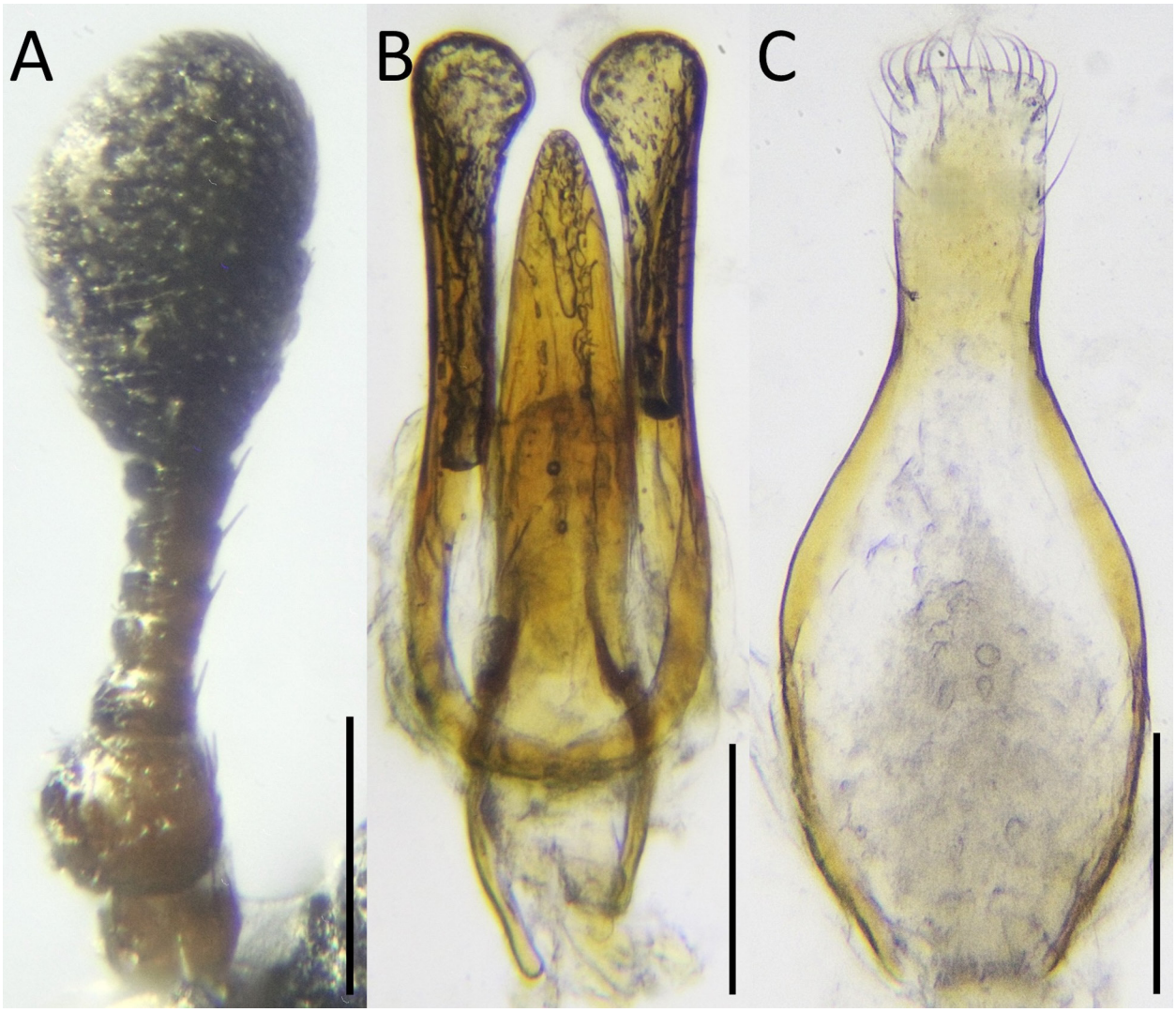

Figure 7. *Anthrenus vorsti* Holloway **sp. nov.** holotype male. **A)** Antenna. **B)** Aedeagus. **C)** Sternite IX. All scale bars = 100 µm.

Description, external characteristics. Mean male BL = 1.93 mm, BW = 1.38 mm, BW/BL = 0.715; mean female BL = 2.11 mm, BW = 1.47, BW/BL = 0.7. Single amber-colored ocellus in centre of face just below level of top of eyes, inner lower margin of eyes with distinct notch (Fig. 6A). Integument of head and pronotum dark brown. Vertex with small, cream-colored scales down to ocellus with some pale-brown scales in centre of vertex. Lateral edges of vertex and rest of face down onto clypeus with white scales. Labrum red. Pronotum with broad, oval, overlapping white, buff, pale- and dark-brown scales, white scales focussed along lateral margins and first part of anterior margin. Scutellar shield small, triangular, black. Elytral integument dark brown with white, yellow and brown scales (Fig. 6B). White scales arranged in three loose fasciae, sub-basal, sub-medial, and sub-apical. Sub-basal fascia sinuate consisting of at least four patches of white scales interlinked with yellow scales reaching up towards scutellar shield near the elytral suture. Sub-medial fascia less sinuate with three patches of white scales interlinked with yellow scales. Sub-apical fascia smaller consisting of two patches of white scales with yellow scales in between and merging with yellow and white apical patch. Many yellow scales scattered across elytra between fasciae and along elytral base. White and yellow scales set in background of brown scales.

Ventrites (Fig. 6C) with dark integument covered in overlapping white scales, slightly yellowish on lateral margins of ventrites 3–5. Antenna with 10 antennomeres (Fig. 7A). Antennomeres 1–2 red, globular;

antennomeres 3–7 red, transverse; antennomeres 8–10 darker forming a large, well-defined, slightly off-set, hirsute club. Legs reddish brown.

Description, internal characteristics (male). Brown aedeagus (Fig. 7B) much longer than wide with two rod-shaped parameres (PL = 300 µm) joined at base forming perfect semi-circle before broadening just before halfway and extending posteriad. Outer margins of parameres very slightly concave, posterior tips broad, spatulate, tilted inwards. Inner corner of posterior margin slightly angled over tip of median lobe and paddles devoid of setae. Median lobe (ML = 315 µm) broad, bullet-shaped, expanding slightly from broad base, widest in the middle, margins converging to sharply rounded posterior tip fitting neatly under spatulate tips of parameres. Sternite IX (Fig. 7C, SL = 350 µm) pale brown with posterior lobe occupying ⅓ length of sternite IX, rest of sternite consisting of two anterior pointing horns, outer margins evenly convex. Posterior lobe with white tissue along posterior margin and down lateral margins. Setae emerge marginally and sub-marginally only from white tissue in posterior half of posterior lobe, densest on outer corners of posterior margin where the setae curve inwards.

Description, internal characteristics (female). No sclerites in the bursa copulatrix.

Etymology. The species is named in honour of Oscar Vorst, curator of the Coleoptera collection at the Naturalis Biodiversity Centre, Leiden, the Netherlands.

Differential diagnosis. *Anthrenus vorsti* does not resemble *A. jordanicus*, which is largely pale, or *A. prietoi* (described above) which is more orange than *A. vorsti* with a very short, squat aedeagus that does not resemble *A. vorsti*. Looking further afield into the Arabian Peninsula, *A.* (*Anthrenodes*) *malkini* Mroczkowski, 1980 (Fig. 8A) requires consideration, and externally *A. vorsti* resembles *A.* (*Anthrenodes*) *pica* Holloway and Herrmann, 2025 (Fig. 8B), and *A.* (*Anthrenodes*) *translucens* Holloway and Herrmann, 2025 (Fig. 8C) (see Holloway and Herrmann 2025). *Anthrenus malkini* has more orange scales than *A. vorsti* (although color pattern plasticity is common in some *Anthrenus* species (Holloway et al. 2022)), but *A. malkini* parameres (Fig. 9A) have several setae lining inner margin of posterior spatulae, and the median lobe is blunt tipped. *Anthrenus pica* has a similar color pattern to *A. vorsti*, but *A. pica* parameres (Fig. 9B) have several setae lining inner margin of the posterior paddles, and the median lobe is too slim and pointed. *Anthrenus translucens* has a similar color pattern to *A. vorsti*, and the median lobe (Fig. 9C) closely resembles that of *A. vorsti*. However, *A. translucens* parameres (Fig. 9B) have several setae lining the inner margin of the posterior spatulae. *Anthrenus translucens* sternite IX (Fig. 9D) has no setae along middle part of the posterior margin and the pattern of white tissue on the posterior end of the posterior lobe differs from *A. vorsti*.

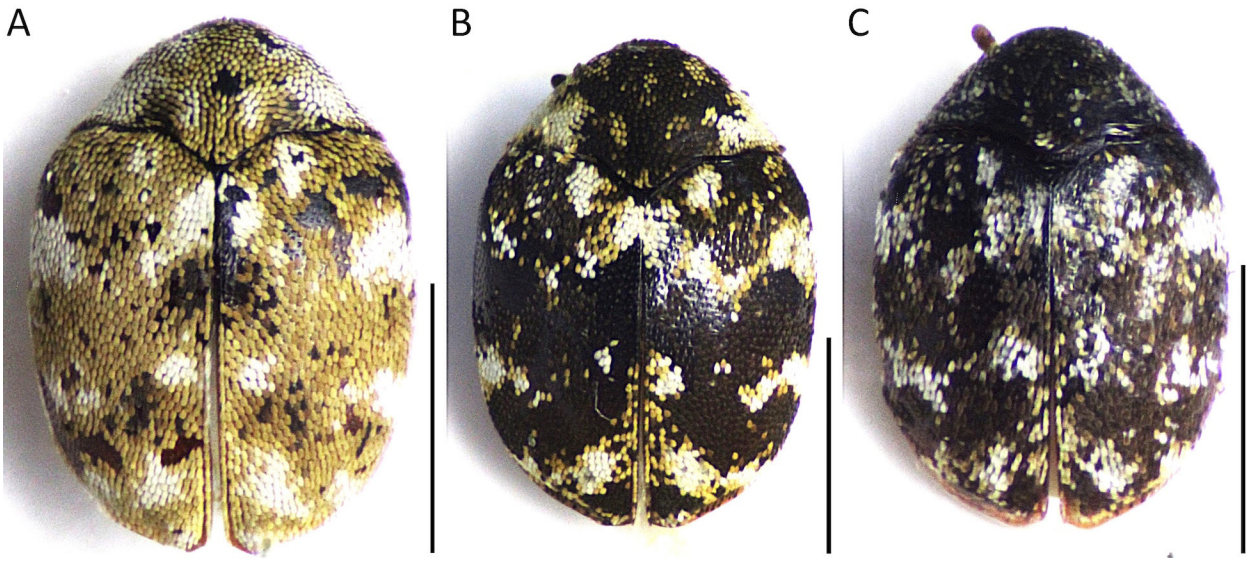

Figure 8. *Anthrenus* spp. habitus photos. **A)** *Anthrenus malkini* Mroczkowski, 1980. **B)** *Anthrenus pica* Holloway and Herrmann, 2025. **C)** *Anthrenus translucens* Holloway and Herrmann, 2025.

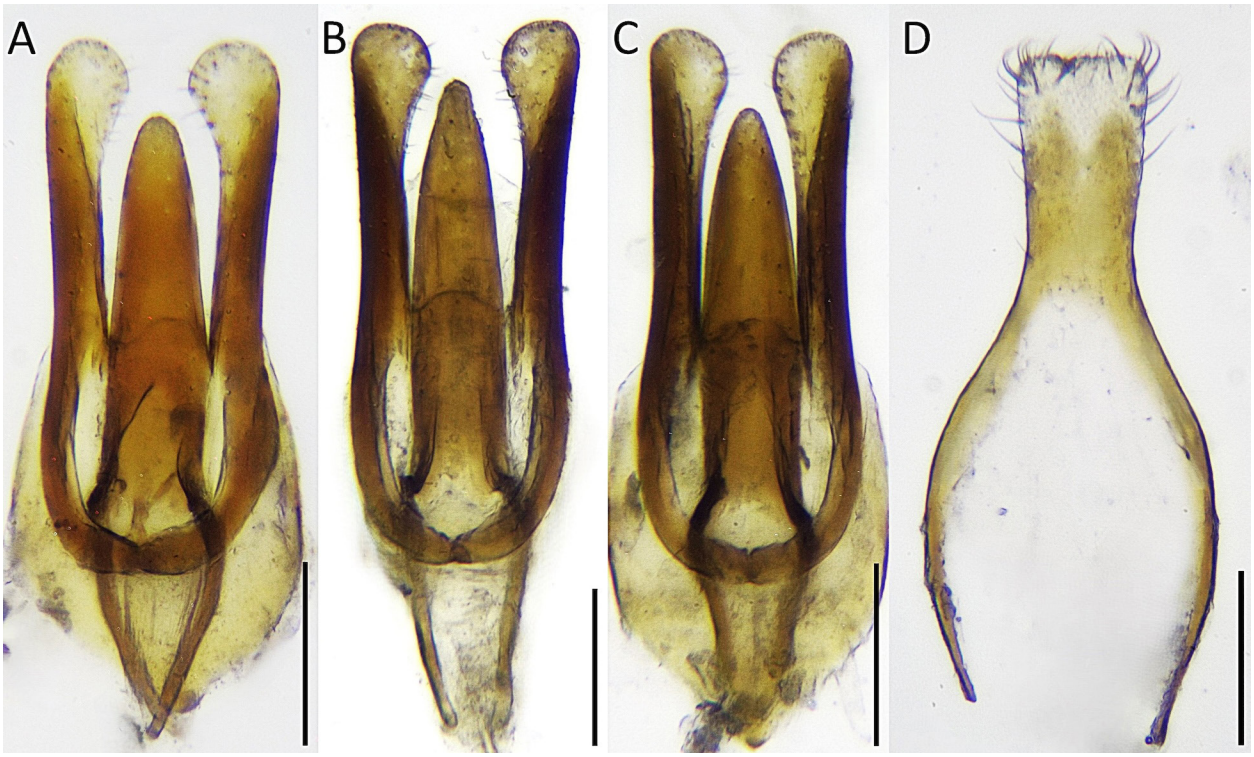

Figure 9. A) *Anthrenus malkini* Mroczkowski, 1980 aedeagus. **B)** *Anthrenus pica* Holloway and Herrmann, 2025 aedeagus. **C)** *Anthrenus translucens* Holloway and Herrmann, 2025 aedeagus. **D)** *Anthrenus translucens* Holloway and Herrmann, 2025 sternite IX. All scale bars = 100 μm.

Anthrenus (*Anthrenodes*) *faillei* Holloway, new species

(Fig. 10–11)

Type specimens. Holotype male. Jordan, Wadi Schaib (31.923, 35.656), 200m 12.ix.1956, J. Klapperich leg. (SMNS).

Paratypes. Three males, four females same data as holotype (two males, one female (SMNS); one male, one female (NHMUK); one female (RMNH); one female (AHEC). One female (SMNS), Jordan, Dehbeen b.Jerash (32.251, 35.829), 13.vi.1963 J. Klapperich leg.; one male (RMNH), Jordan, Shobak (30.518, 35.557), 25.vii.1968 J.

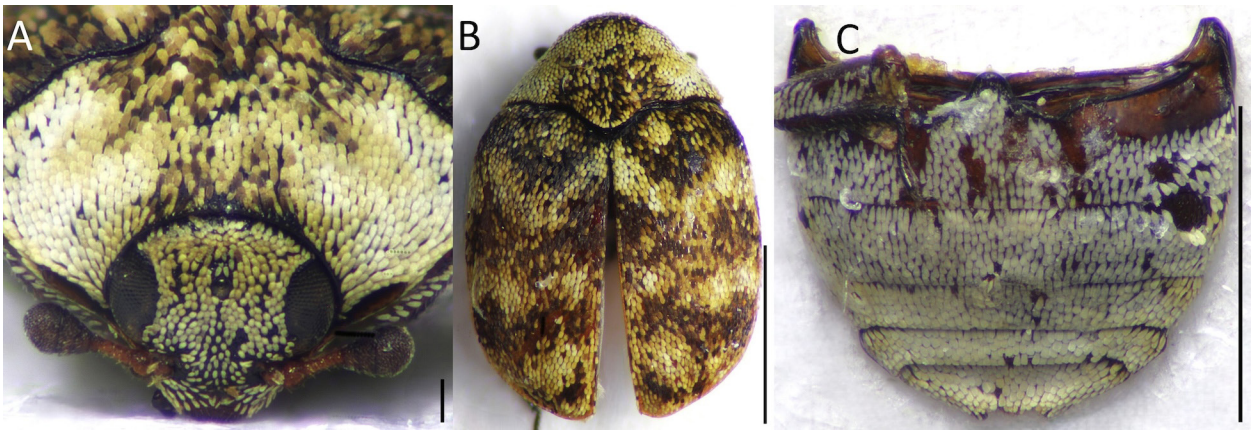

Figure 10. *Anthrenus* (*Anthrenodes*) *faillei* Holloway **sp. nov.** holotype. **A)** Head (scale bar = 100 μm). **B)** Habitus (scale bar = 1 mm). **C)** Ventrites (scale bar = 1 mm).

Figure 11. *Anthrenus* (*Anthrenodes*) *faillei* Holloway **sp. nov.** holotype. **A)** Antenna. **B)** Aedeagus. **C)** Sternite IX. Scale bars = 100 μm in all cases.

Klapperich leg.; one male (AHEC), Jordan, Fuheis b. Amman (32.008, 35.785), 27.ix.1956; one female (SMNS), Jordan, Fuheis b. Amman (32.008, 35.785), 3.viii.1956.

Description, external characteristics. Male mean BL = 2.06 mm, mean BW = 1.38 mm, mean BW/BL = 0.67; female mean BL = 2.0 mm, BW = 1.35 mm, BW/BL = 0.67. Head and pronotal integument dark brown (Fig. 10A). Single dark amber ocellus in middle of head just below level of eyes, lower inner margins of eyes with notch. Posterior edge of vertex with small, pale-yellow scales, top and front of vertex with yellow ochre scales, some pale brown scales near ocellus. Below ocellus, face with small, pale-yellow scales, clypeus below each antenna attachment with pale-yellow setiform scales all pointing in towards clypeal disc. Labrum red. Outer thirds of pronotum with large, broad-oval, overlapping, pale scales, pale-yellow scales in three horizontal bands, outer third of anterior margin, outer third medial region, outer third posterior margin. White scales between the pale-yellow bands. Central third of pronotum with admixed dark brown, pale brown, and yellow scales. Scutellar shield black, triangular, wider than long. Elytral integument dark brown across base (Fig. 10B), becoming redder towards apices. Elytra with scales of four colors: dark brown, pale brown, yellow ochre, and pale-yellow. Paler scales concentrated in three fasciae, sub-basal, sub-medial, and sub-apical. Bands consist of yellow ochre and pale-yellow scales. Sub-basal fascia zigzags from margin, narrowing towards elytral suture, finally reaching up to elytral suture either side of scutellar shield. Above sub-basal fascia, two basal patches of pale scales either side of scutellar shield but

separated from sub-basal fascia. Sub-medial fascia undulates slightly from lateral margin but only weakly reaches elytral suture. Sub-apical fascia consists mainly of large sub-apical sub-sutural patch of pale scales with a second, smaller lateral patch of pale scales. Pale scales lining sutural margin joining sub-medial and sub-apical fasciae. Fasciae set in dark background of mostly dark brown and pale brown scales with scattering of yellow ochre scales.

Ventrites (Fig. 10C) with creamy white scales covering ventrites 1 and 2. Scales more densely packed and tinted yellow across ventrites 3–5. Yellow on scales slightly more intense at anterior ends of lateral margins of ventrites 2–5. Antennae (Fig. 11A) with ten antennomeres, antennomeres 1–2 red, globular, antennomeres 3–7 red, transverse (Antennomere 7 wider than preceding four antennomeres), antennomeres 8–10 dark red, forming well-defined, slightly offset, hirsute club. Legs reddish brown.

Description, internal characteristics (male). Aedeagus (Fig. 11B, PL = 309 μm) slim, with rod-shaped parameres. Parameres joined at anterior base, diverge and turn posteriad to form semicircle open at posterior end. Parameres expand, continue posteriad, with spatulate-shaped ends. Outer margins of parameres straight along posterior half, posterior margin of spatula slopes down toward tip of median lobe. Stout, short, pointed setae on inner surface of spatulae, overlapping inner angle of posterior margin. Parameres brown throughout except spatulae pale. Interface between brown and pale tissue sharply defined following a straight line from outer posterior margin corner to short way down inner margin. Median lobe (ML = 325 μm) brown, slim from base, parallel-sided for first half, thereafter gradually converging to blunt, evenly rounded apex. Sternite IX (Fig. 11C, SL = 360 μm) with posterior lobe occupying ⅓ of total length; slight neck at base of posterior lobe; posterior margin flat. Sternite IX pale brown apart from tissue lining posterior margin and short way down lateral margins. Many setae emerging from pale tissue, small setae along posterior margins, longest setae sub-posterior margin, setae at corners of posterior margin strongly hooked inwards. Some straight, hair-like setae all pointing posteriad emerging from brown tissue on disc of posterior lobe and down lateral margins, one seta on each side below neck of posterior lobe. Anterior ⅔ of sternite IX consists of two slim horns that diverge from posterior lobe neck, kink halfway and then converge to apices.

Description, internal characteristics (female). No evidence of sclerites in bursa copulatrix.

Etymology. The species is named in honour of Arnaud Faille, Deputy Head Department of Entomology and Curator of Coleoptera, Staatliches Museum für Naturkunde, Stuttgart, Germany.

Differential diagnosis. Only *A. vorsti* has a colour pattern approaching *A. faille*. However, the overall appearance of *A. vorsti* is dark brown and white with more rounded scales (Fig. 6B), whereas *A. faillei* is yellow and brown. The antennal club of *A. vorsti* is dark brown, whereas *A. faillei* has a red antennal club. *Anthrenus vorsti* has a broader median lobe with a sharper tip (Fig. 7B) and the paramere apical spatulae are broader than in *A. faillei*.

Anthrenus (*Anthrenodes*) *tenebrosus* Holloway, new species

(Fig. 12–13)

Type specimens. Holotype female. Jordan, Beida (30.371, 35.448), 4 kms north of Petra, 25.vii.1985, Ph. Pronk leg. (RMNH, catalogue number RMNH.INS.1492164).

Paratypes. None.

Description, external characteristics. Holotype (Fig. 12), BL = 2.0 mm, BW = 1.4 mm, BW/BL = 0.7. Overall appearance dark, with brown scales, spots of white scales. Single dark brown ocellus in centre of face close to level of top of eyes, lower inner margin of eyes notched (Fig. 12A). Integument of head and pronotum dark brown, edges of antennal fossae and posterior margin of pronotum red. Top of vertex with oval, overlapping pale brown/yellow scales, in front of vertex down to ocellus covered in pale brown/brown scales, some pale brown scales extending beyond ocellus onto face. Pale scales lining inner eye margins and extending across face. Lower face and clypeus with yellow scales, scales narrower on clypeus. Labrum red. Outer regions of pronotum with bright white, broadly oval, overlapping scales, larger than scales on head. Anterior pronotal margin with pale brown scales, becoming darker towards posterior margin. Scutellar shield small, triangular, black. Elytral integument dark brown across base and down elytral suture to halfway (Fig. 12B). Posterior half of elytral integument red. Elytra covered in various shades of brown, oval scales, many scales fractured laterally. Bright white scales form

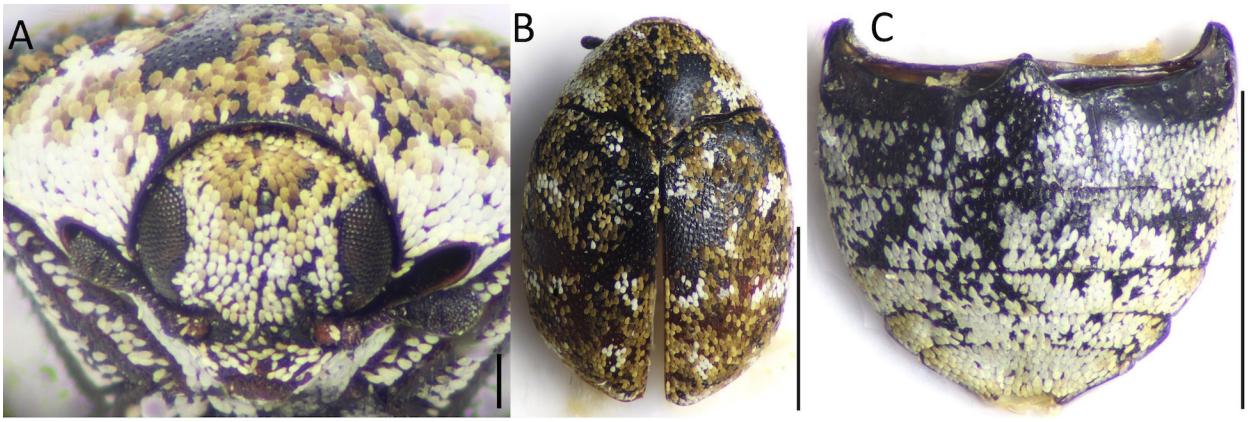

Figure 12. *Anthrenus* (*Anthrenodes*) *tenebrosus* Holloway **sp. nov.** holotype. **A)** Head (scale bar = 100 μm). **B)** Habitus (scale bar = 1 mm). **C)** Ventrites (scale bar = 1 mm).

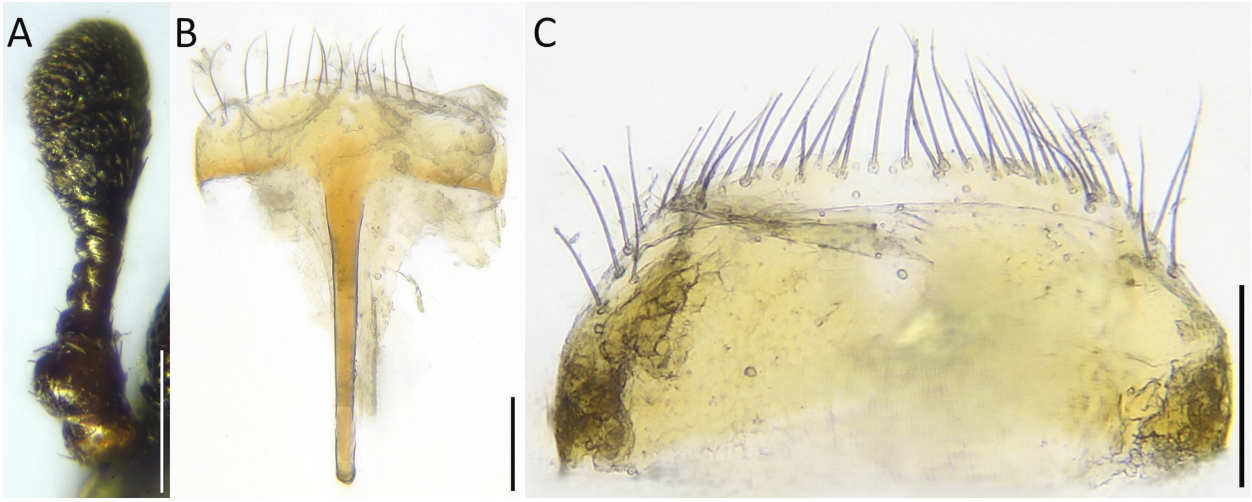

Figure 13. *Anthrenus* (*Anthrenodes*) *tenebrosus* **sp. nov.** holotype. **A)** Antenna. **B)** Sternite VIII. **C)** Tergite VIII. All scale bars = 100 μm.

three fasciae, sub-basal zigzagging from lateral margin up towards scutellar shield, sub-medial straight from lateral margin falling short of elytral suture, sub-apical consisting of just two spots of white scales, one sub-apical, sub elytral suture, the other at lateral margin. All three fasciae weak and narrow, formed from dislocated spots of white scales. The scales on the head and anterior part of the pronotum are generally pale in contrast to the dark appearance of *A. tenebrosus* dorsal aspect.

Ventrites (Fig. 12C) covered in cream and pale-yellow ochre scales. Yellow ochre scales focussed along lateral margins of ventrites 2–5 as a small pale patch of discoloration on anterior part of ventrite 2 lateral margin, progressively darker and more extensive towards ventrite 5. Several scales fractured like dorsal scales.

Antenna (Fig. 13A) with ten antennomeres, globular antennomere 1 bright red, globular antennomere 2 duller red, smaller transverse antennomeres 2–7 dark brown slightly tinted red, antennomeres 8–10 forming well-defined dark brown, slightly asymmetric club. Legs dark brown with slight reddish tint.

Description, internal characteristics (female). Parasol-shaped sternite VIII (Fig. 13B) with posterior lobe slightly narrower than length of orangey-brown anterior stem. Anterior margin of posterior lobe same colour as anterior stem, rest of posterior lobe pales brown other than white posterior margin. Posterior margin with about 16 (eight visible on one side of posterior lobe) long, equally spaced setae emerging from white tissue, with about

four additional setae forming line just anterior to marginal setae at centre of posterior margin. Lateral halves of posterior margin straight and slightly inclined upwards towards bluntly pointed central apex. Outer corners of posterior margin relatively sharp turning down to straight lateral margins, parallel to each other and orientated anteriad. Tergite VIII (Fig. 13C) pale brown, patch of white across centre of posterior margin down onto disc of tergite, with slightly convex posterior margin, that turns progressively anteriad at outer corners ending in short, straight lateral margins, parallel to each other. Convex posterior margin lined with many long setae, all angled in towards centre. Outer corners each with about five longer setae.

No evidence of sclerites in bursa copulatrix.

Etymology. The new species is named "*tenebrosus*" (the Latin word for 'dark') after its dark appearance.

Differential diagnosis. Of the other Jordanian *Anthrenodes* with notched inner eye margins, *A. jordanicus* is entirely pale with red antennae, *A. vorsti* is banded with dark and light patterning and a bright red antennal flagellum, *A. faillei* is banded with dark and pale brown scales and red antennae, and *A. tenebrosus* is unbanded, dark with small patches of white scales on the elytra plus dark antennae.

Distribution. All four new species described here are currently only known from Jordan, close to or in the Jordan Valley (Fig. 14).

Discussion

In the current study, a sample of *Anthrenus* from Jordan was studied revealing four new species. It suggests that there is still a lot to be learnt about Dermestidae. All species belonged to the subgenus *Anthrenodes*: species of *Anthrenus* with ten antennomeres. Two types of male genitalia, and associated eye margin structure, have been found: *A. prietoi* and *A. bicolor* (plus *A. pulchellus*) with a short squat aedeagus and complete inner eye margins, and the remaining species with long, slimmer aedeagi, rod-shaped parameres and notched inner eye margins. Both *A. prietoi* and *A. bicolor* have large sclerites within the bursa copulatrix, which presumably play a role during copulation. The aedeagi of both these species are very short and could not penetrate the female far during copulation. The median lobe is strongly hooked, so it is likely that the sclerites in the bursa copulatrix attach to the hooked median lobe during copulation to pull and hold the aedeagus in place. *Anthrenus sarnicus* Mroczkowski,

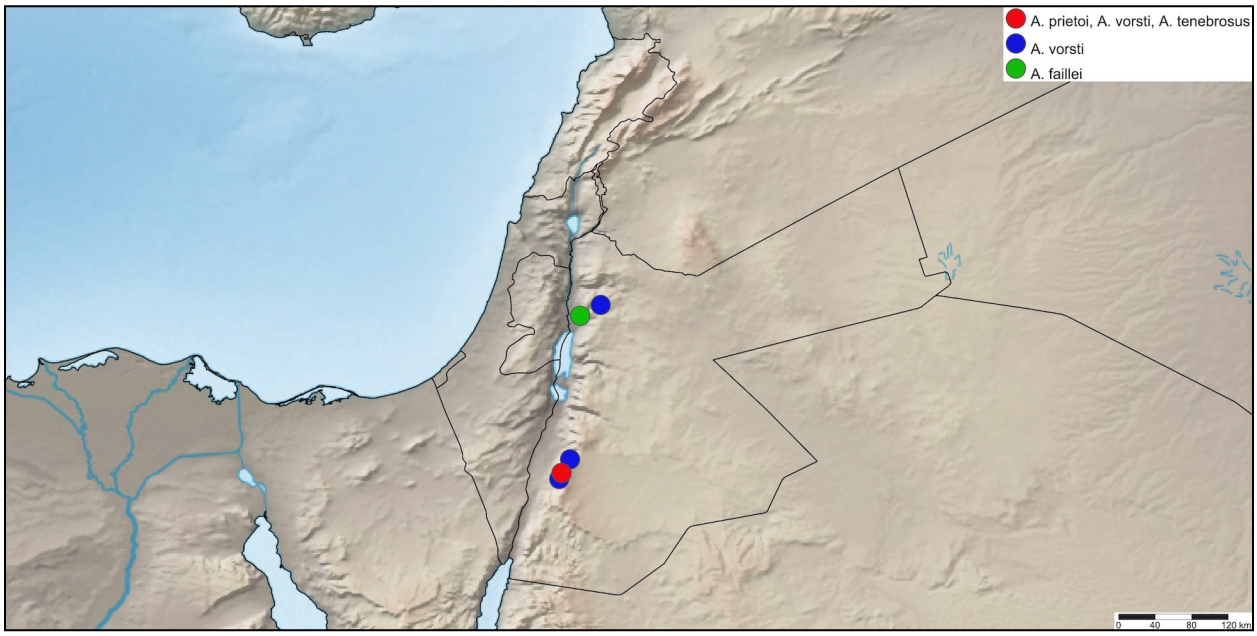

Figure 14. Distributions of *Anthrenus prietoi*, *Anthrenus vorsti*, *Anthrenus faillei*, and *Anthrenus tenebrosus* across Jordan.

1963 is also an *Anthrenodes* species with a tiny, squat aedeagus and it too has large sclerites within the bursa copulatrix (Holloway and Pinniger 2024). Holloway and Pinniger (2024) proposed a mechanism for how the sclerites might interact with the aedeagus during copulation based on the arrangement and structures of these sclerites. It is less clear how the sclerites shown in Fig. 2 might operate to draw the aedeagus into the bursa copulatrix during copulation. However, these are examples of how female structures within the bursa copulatrix probably provide females with complete control over which males they choose to mate with. None of the females of species with rod-shaped parameres had sclerites in the bursa copulatrix. It is possible that the females of these species use muscular contractions to grip and assess features on the aedeagus.

The new species *A. tenebrosus* is currently known only from a single female specimen. However, the inner eye margin had a distinct notch, suggesting that the male, when found, will have rod-shaped parameres.

The current study brings the number of *Anthrenodes* species known from Jordan to six:
Anthrenus (*Anthrenodes*) *bicolor* Holloway, 2026
Anthrenus (*Anthrenodes*) *faillei* Holloway, **new species**
Anthrenus (*Anthrenodes*) *jordanicus* Pic, 1934
Anthrenus (*Anthrenodes*) *prietoi* Holloway, **new species**
Anthrenus (*Anthrenodes*) *tenebrosus* Holloway, **new species**
Anthrenus (*Anthrenodes*) *vorsti* Holloway, **new species**

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