



## *Oiceoptoma tangi* (Coleoptera: Silphidae: Silphinae), a new species of carrion beetle from eastern China

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### Abstract

A new species, *Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, from Zhejiang Province, China, is described and illustrated. The new species is closely related to *O. subrufum* (Lewis, 1888), distributed in Central and North-eastern China, the Korean Peninsula, Far East of Russia and Japan, and to *O. nigropunctatum* (Lewis, 1888), endemic to Japan. All three species are keyed, and distribution maps of all three species are presented.

**Key words:** Coleoptera, Silphidae, Silphinae, *Oiceoptoma*, taxonomy, morphology, new species, description, China, Palaearctic Region

### Introduction

The carrion beetle genus *Oiceoptoma* Leach, 1815 is classified as a member of the crown clade of Silphinae, sister to *Dendroxena* Motschulsky, 1858, *Necrophila* Kirby & Spence, 1828, and *Silpha* Linnaeus, 1758 (*sensu lato*) (Ikeda *et al.* 2008; 2012). *Oiceoptoma* is Holarctic in distribution: three species are Nearctic (Anderson & Peck 1985; Peck & Kaulbars 1987), another six species are Palaearctic and partially also Oriental. Only one species (*O. thoracicum* (Linnaeus, 1758)) is Transpalaearctic, a further five species are found in the eastern Palaearctic Region and the northern Oriental Region (Růžička *et al.* 2004; Ji 2012; Růžička 2015; Newton 2021). The formerly separate, monospecific genus *Isosilpha* Portevin, 1920 is currently considered as a junior subjective synonym of *Oiceoptoma* (Peck 2001; Růžička *et al.* 2004). Růžička *et al.* (2004) published a taxonomic revision of the Palaearctic species of *Oiceoptoma*, with diagnoses of species, lectotype designations in several cases, synonymy of some names, and distribution maps.

Růžička *et al.* (2004) cited some material of *O. subrufum* (Lewis, 1888) from the Tianmu Shan Mts., Zhejiang Province of China, based on two old specimens with imprecise locality data. Recent re-examination of this material and availability of additional specimens collected in Zhejiang Province, kindly made available by Li-Zhen Li, Liang Tang and Zi-Wei Yin (SNUC), revealed the existence of another, as yet undescribed, *Oiceoptoma* species in Eastern China. In the present paper, we describe this new species, and compare it with *O. nigropunctatum* (Lewis, 1888) and *O. subrufum*, and map the known distribution of these taxa in Eastern Asia.

### Material and methods

**Museum abbreviations.** Specimens examined in this study are deposited in the following museums and private collections:

BMNH—Natural History Museum (formerly British Museum, Natural History), London, United Kingdom (Maxwell Barclay)

EUMJ—Ehime University Museum, Matsuyama-shi, Japan (Hiroyuki Yoshitomi);  
JRUC—collection of Jan Růžička, Prague, Czech Republic;  
JSCC—collection of Jan Schneider, Prague, Czech Republic;  
SNUC—Insect Collection of Shanghai Normal University, Shanghai, China (Liang Tang, Zi-Wei Yin).

Specimens of the newly described species are provided with one red printed label “**HOLOTYPE** ♂, [or] **PARATYPE** ♂ [or] ♀ | **Oiceoptoma** | **tangi** sp. nov. | D. Sommer, J. Růžička, | M. Nishikawa & J. Schneider des. 2021”. Verbatim label data are cited for the type material, individual lines of every label are separated by a vertical bar (“|”), individual labels by a double vertical bar (“||”). Information in quotation marks (“ ”) indicates the original spelling. Our remarks and additional comments are found in brackets (“[ ]”), [p]—preceding data within quotation marks are printed, [hw]—the same, but handwritten.

**Morphological analyses.** Material was examined using an Olympus SZX10 stereomicroscope and a Keyence VHX6000 digital microscope. Male genitalia and female abdominal segments were cleaned in a 10% KOH solution for several hours at room temperature. Subsequently, they were inserted in glycerol for several days and then transferred to 96% alcohol. The photographs were taken from genitalia mounted temporarily in Kaiser’s glycerol gelatine (phenol-free) (Merck, Germany). After taking the photographs, they were stored in glycerol in glass micro vials with silicone stoppers (BioQuip Products, Inc., California, USA) attached to the same pin as the corresponding dry mounted specimens. Alternatively, external details of morphology were taken from dry, cleaned specimens. Habitus photographs were taken using a Canon macro photo lens MP-E 65mm on a Canon 550D. Multiple layers of focus were combined using Zerene Stacker 1.04 (<http://www.zerenesystems.com/cms/stacker>). Photographs of genitalia and other details of external morphology were taken using a Keyence VHX6000 microscope with a VH-Z20T lens. All pictures were digitally enhanced using Adobe Photoshop CC. Plates were arranged in CorelDRAW 2018.

**Measurements.** External morphological characters were measured using the Keyence VHX6000 microscope. Pronotum length was measured along the median line (as posterior angles are slightly prolonged in some species); pronotum width was measured at its widest point perpendicular to the median line; elytra length was measured from the posterior margin of the scutellum to the tip of the elytra in dorsal view. Total body length was measured from the anterior margin of the labrum (with the head in the extended position) to the apex of the elytra. We measured 14 males (incl. holotype) and 9 females of the newly described species.

**Maps.** The distribution maps were produced and edited in ESRI ArcMap 10.6 of ArcGIS Desktop 10.6 suite. For map layers, free levels 0–1 data from Global Administrative Areas (<http://www.gadm.org>, ver. 2.8), Natural Earth (<http://naturalearthdata.com>, Natural Earth I with Shaded Relief, Water, and Drainages), combined with World Shaded Relief (<https://www.arcgis.com/home/item.html?id=9c5370d0b54f4de1b48a3792d7377ff2>) (with 45% transparency) were used. For distribution maps, we used data from Růžička *et al.* (2004) and combined them with additional records (J. Růžička, unpublished).

The following specimens of *O. subrufum* and *O. nigropunctatum* were used for comparison and for the photographs (Figs. 2A–E, 3A–C, 4B–C, E–F, 5B–C, E–F, 6B–C, E–F, 7D–E, 8B, 9C–D, 11C–E, 12B–C, E–F, 13C–D, 14A–B, F–H, 15C–E, 16A–D).

### ***Oiceoptoma subrufum* (Lewis, 1888)**

(Figs. 2A–D, 4B, E, 5B, E, 6B, E, 7D, 8B, 9C, 11C–D, 12B, E, 13C–D, 14G, H, 15C–D)

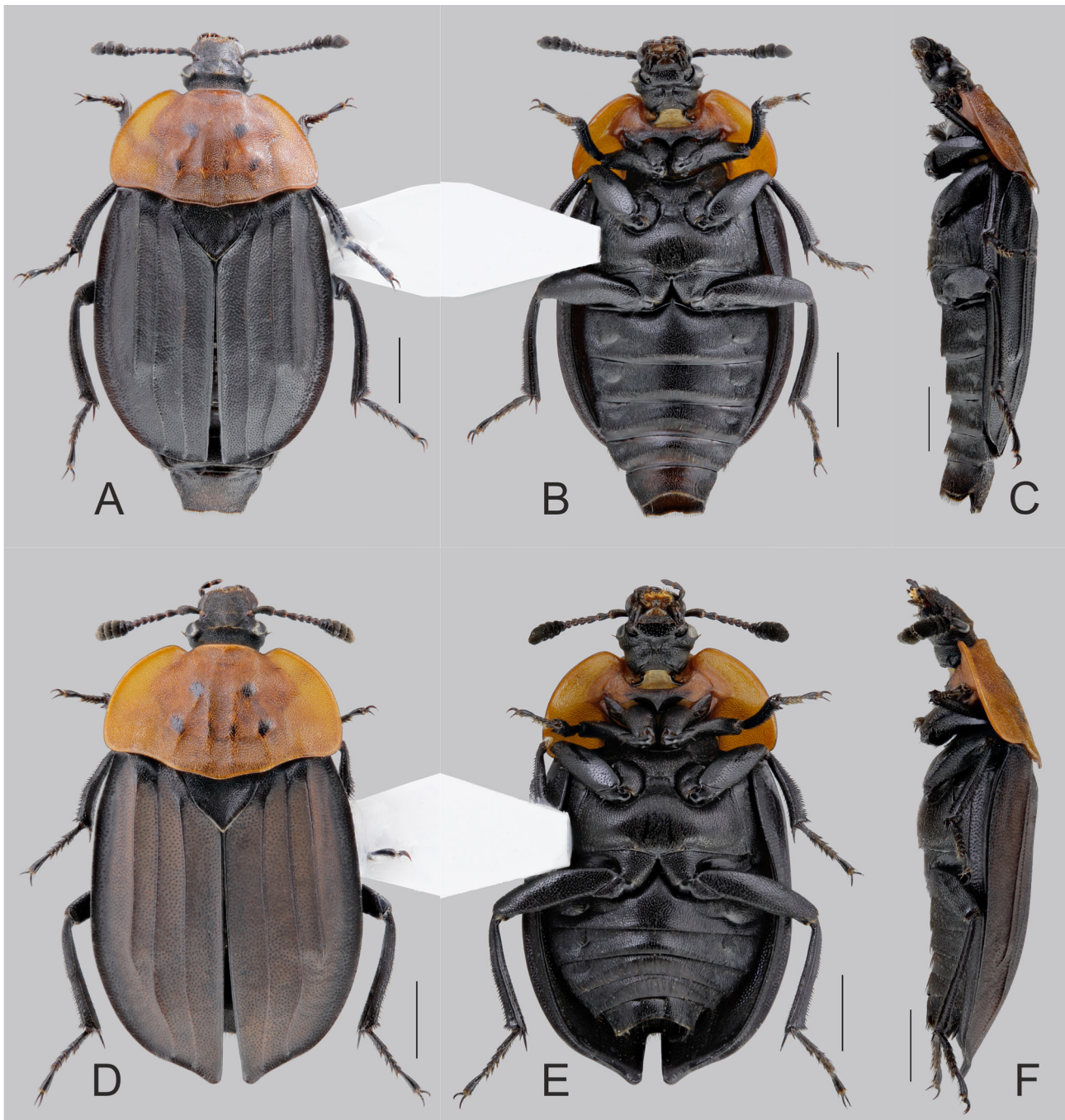
**Material examined.** **Japan, Honshu**, 1 ♂ 1 ♀ (JRUC), Yamanashi prefecture, Makioka-machi, Otometoge pass [ca. 35°16′N 138°59′E], 1450 m, 8.viii.1996, S. Nomura leg. et det. **China, Gansu Province**, 1 ♂ 1 ♀ (JRUC), Lazikou valley, 34°09.9′N 103°51.9′E, 2120 m, 28.vi.2005, J. Hájek, D. Král & J. Růžička leg.

### ***Oiceoptoma nigropunctatum* (Lewis, 1888)**

(Figs. 2E, 3A–C, 4C, F, 5C, F, 6C, F, 7C, 9D, 11E, 14F)

**Material examined.** **Japan, Kyushu**, 1 ♂ (JRUC), Oita prefecture, Kuju mts, Mt. Kurodake [ca. 33°19′N 131°13′E], Shōnai-machi, 19.v.1997, F. Hirokawa leg., S. Nomura det.; 1 ♂ (JRUC), Tokushima prefecture, Kisawa-son, Dosu-

tôge, Naka-gun, 18.vii.–11.x.2004, M. Yoshida leg., S. Nomura det.; 1 ♀ (JRUC), Oita prefecture, Kuju mts, Mt. Kurodake [ca. 33°19'N 131°13'E], 16.viii.1992, Ryo Noda leg., S. Nomura det.



**FIGURE 1.** A–F. Habitus of *Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**: A–C holotype male, D–F paratype female, Pinxi Creek; A, D—dorsal view, B, E—ventral view, C, F—lateral view. Scale 2 mm.

## Taxonomy

### *Oiceoptoma* Leach, 1815

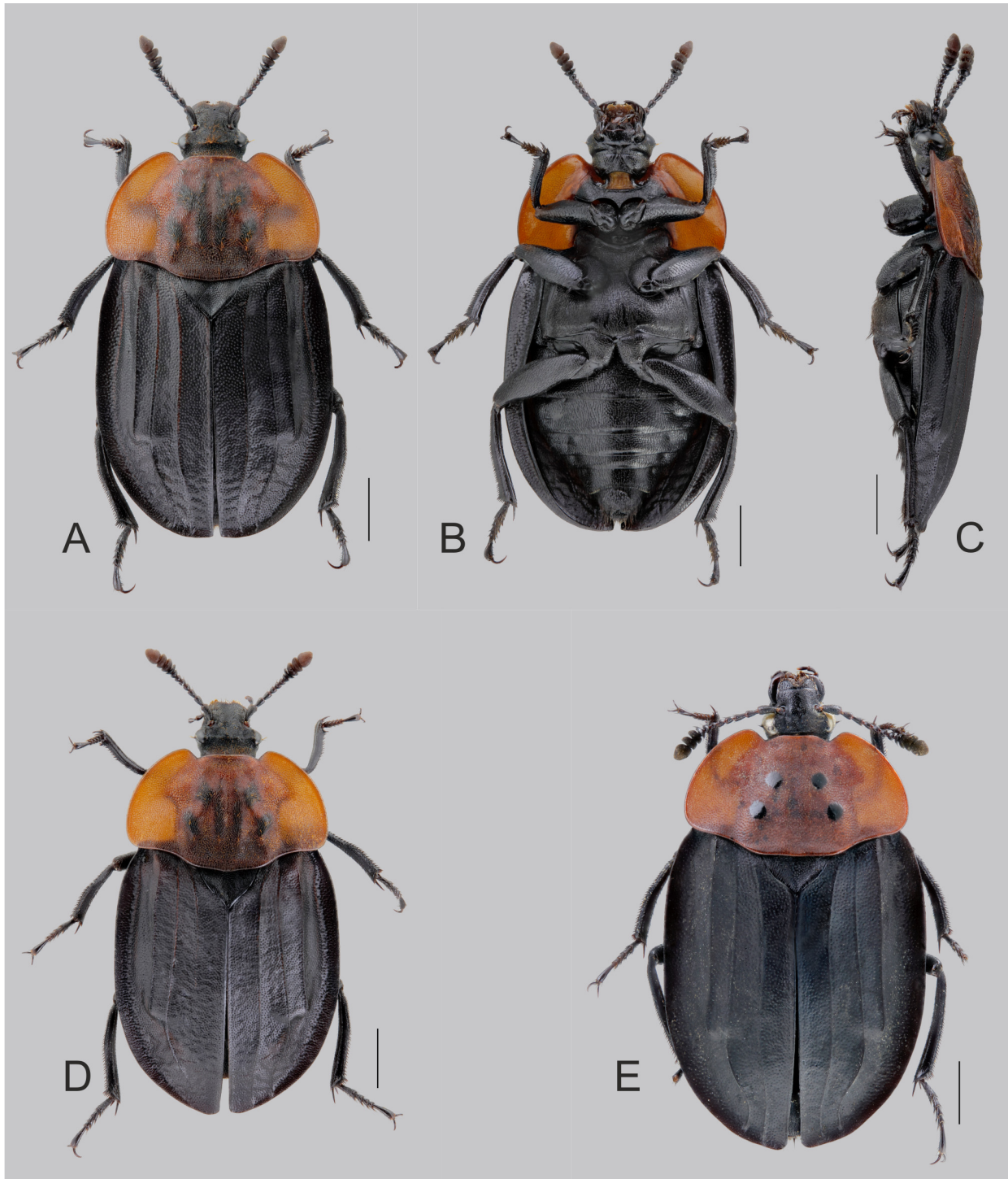
*Oiceoptoma* Leach, 1815: 89 (type species *Silpha thoracica* Linnaeus, 1758, by monotypy).

*Oiceoptoma*: Agassiz 1847: 256, 257 (unjustified emendation of *Oiceoptoma*).

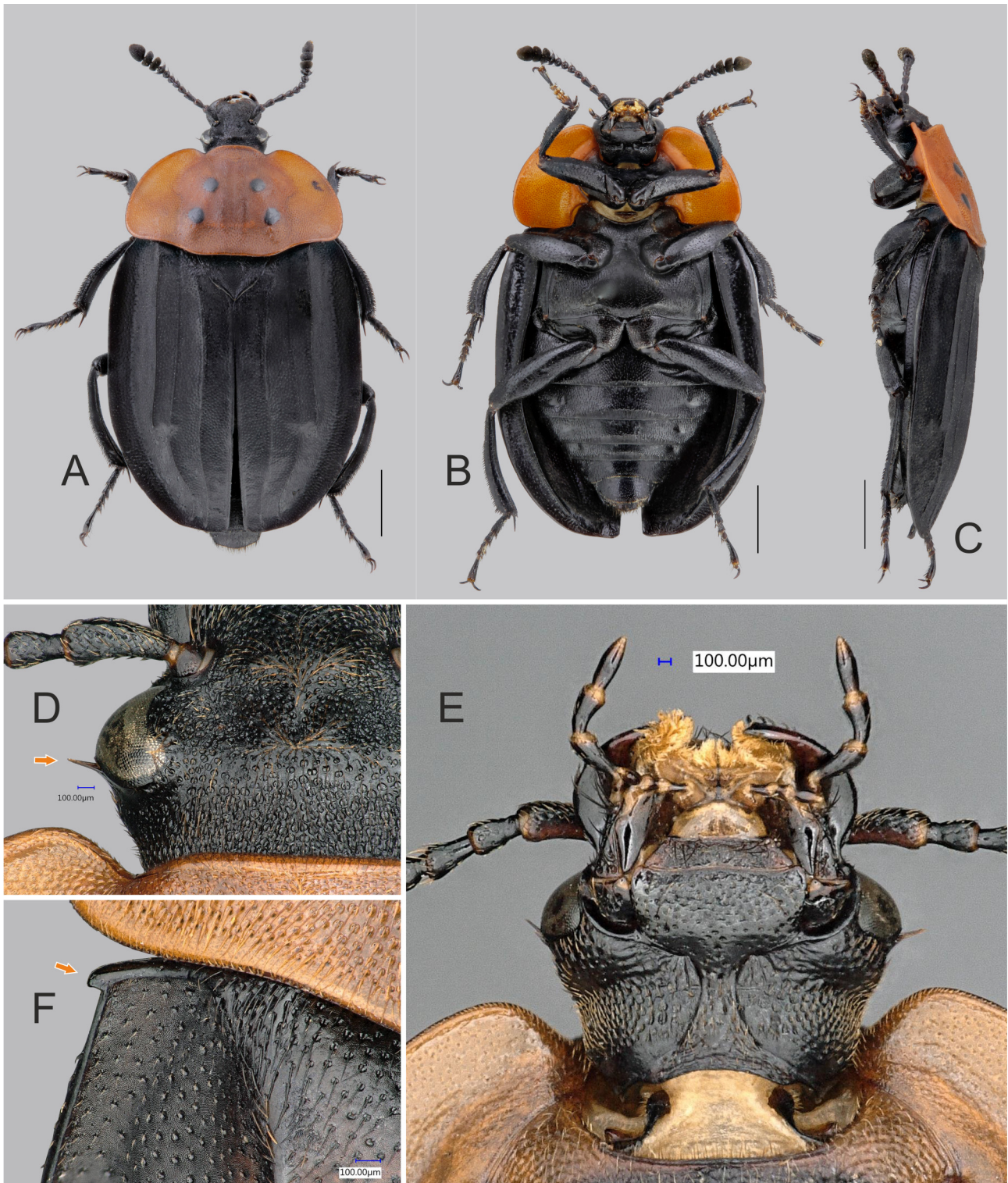
*Isosilpha* Portevin, 1920: 398 (type species *Eusilpha hypocrita* Portevin, 1903, by original designation) (synonymy by Peck 2001: 270).

**Revised diagnosis.** Small to medium-sized species (body length 12.1–16.2 mm) with distinct habitus (Figs. 1A–F, 2A–E, 3A–C; Růžička *et al.* 2004: 37–38, figs. 10–15), body distinctly dorsoventrally flattened and rounded, orange and/or black in colour. Pronotum exceptionally with yellow to pink lateral margins (Ratcliffe 1996: 36, fig. 36; Růžička *et al.* 2004: 37, fig. 12) or with four spots on disc, arranged in trapezoidal pattern (Figs. 1A, D, 2E, 3A). Head with short row of long erect setae behind eyes (Fig. 3D), clypeus anteriorly widely notched (Fig. 8D), frons with transverse, elevated crest posteriorly (Figs. 3D, 17C). Antenna medium-sized, with last four antennomeres forming a distinct club (Figs. 7A, C–E). Elytral shoulders with tooth (Fig. 3F). Median lobe of aedeagus rounded or pointed, parameres always longer than median lobe (Figs. 11A–E; Růžička *et al.* 2004: 35, figs. 1–9).

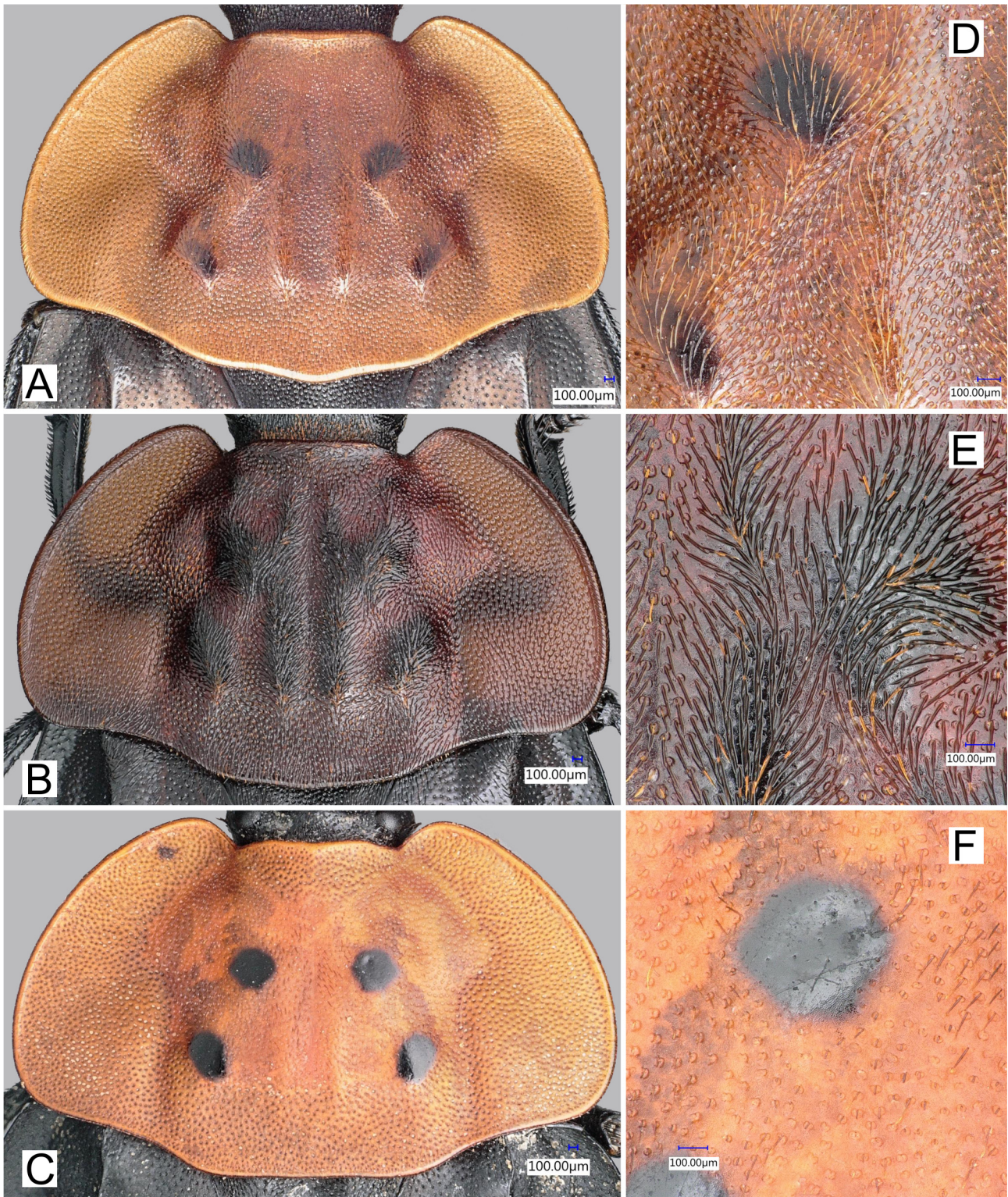
**Distribution.** Holarctic Realm.



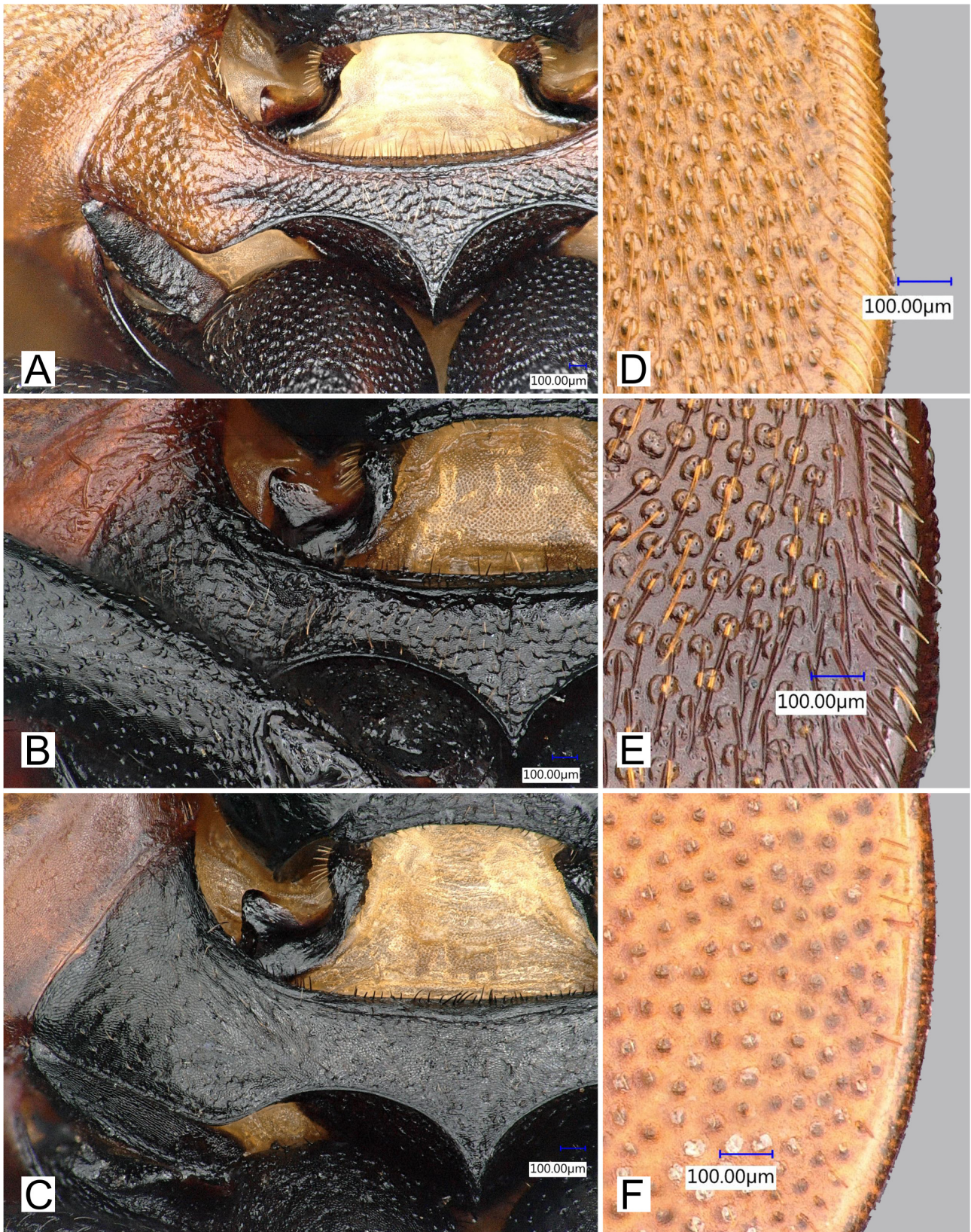
**FIGURE 2.** A–D. Habitus of *Oiceoptoma subrufum* (Lewis, 1888): A–C male, D—female. E. Habitus of *O. nigropunctatum* (Lewis, 1888), female. A, D, E—dorsal view, B—ventral view, C—lateral view. Scale 2 mm.



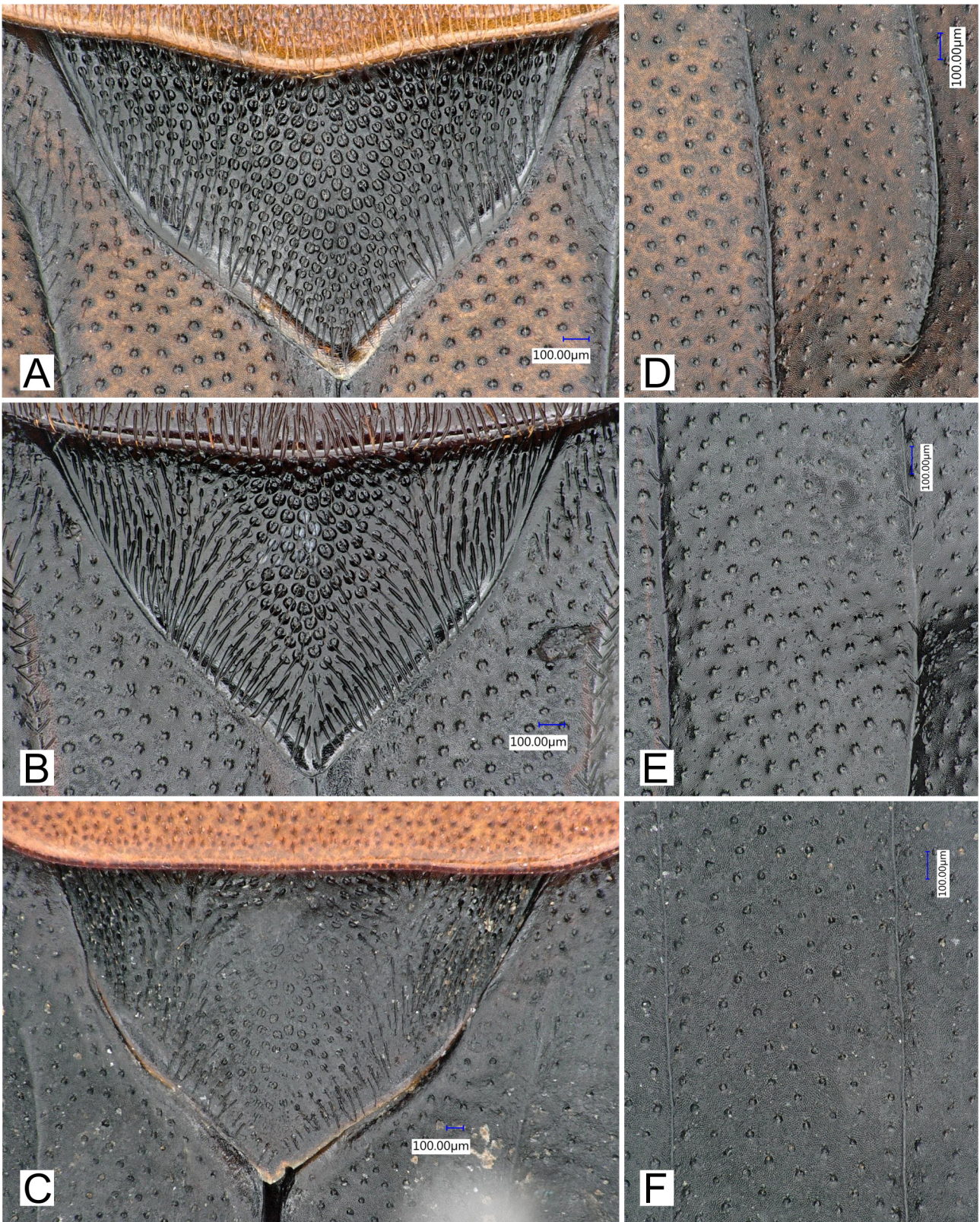
**FIGURE 3.** A–C. Habitus of *Oiceoptoma nigropunctatum* (Lewis, 1888), male. A—dorsal view, B—ventral view, C—lateral view. Scale 2 mm. D–F. Details of *O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, male paratype, Pinxi Creek. D—head dorsally, E—head ventrally, F—humerus of elytra in dorsal view.



**FIGURE 4.** A–C. Pronotum of *Oiceoptoma* in dorsal view. D–F. Detail of pronotal disc of *Oiceoptoma* in dorsal view. A, D—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, Pinxi Creek, B, E—*O. subrufum* (Lewis, 1888), C, F—*O. nigropunctatum* (Lewis, 1888).

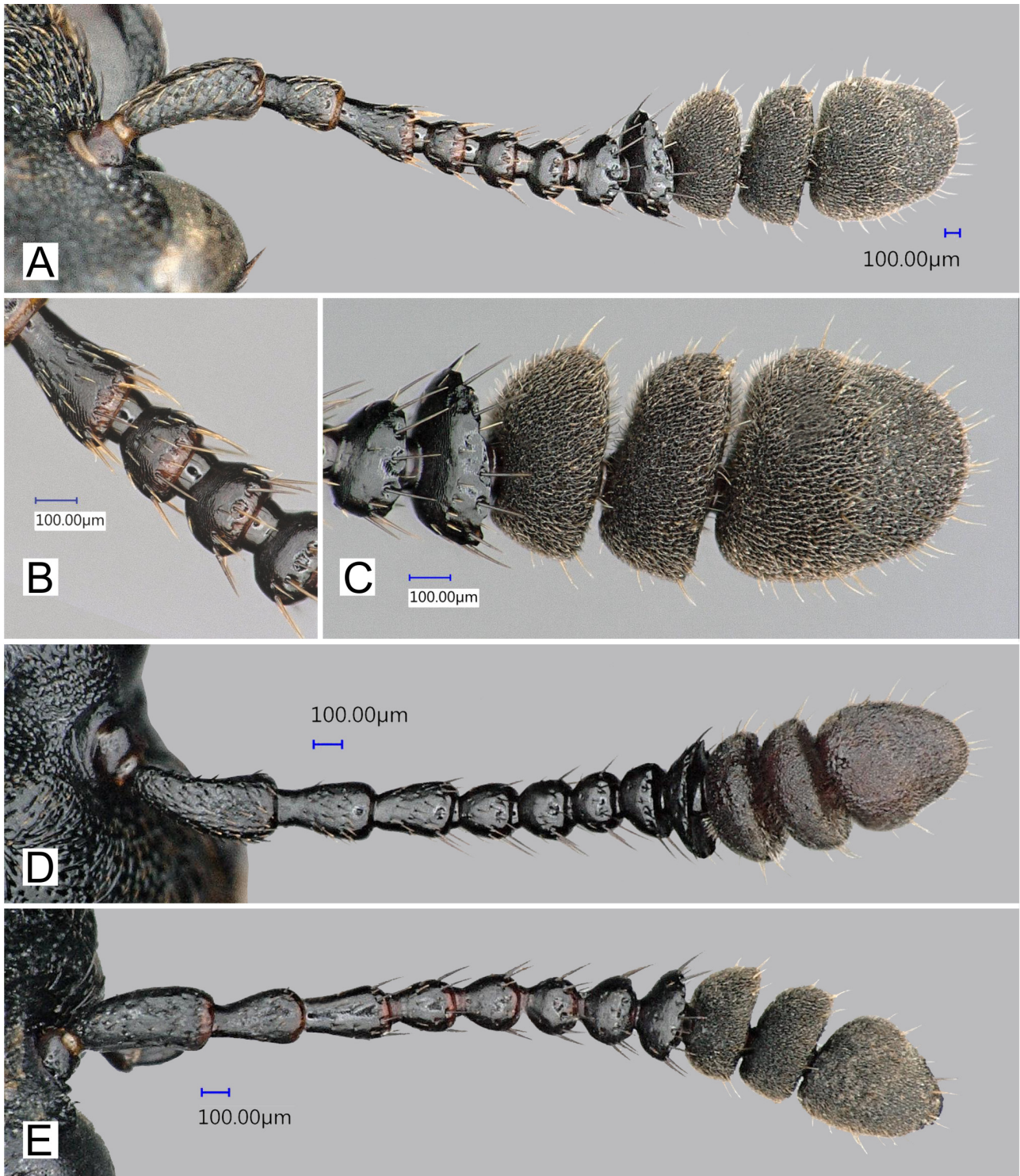


**FIGURE 5.** A–C. Proventrite of *Oiceoptoma* in ventral view. D–F. Detail of pronotal margin of *Oiceoptoma* in dorsal view. A, D—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, Pinxi Creek, B, E—*O. subrufum* (Lewis, 1888), C, F—*O. nigropunctatum* (Lewis, 1888).

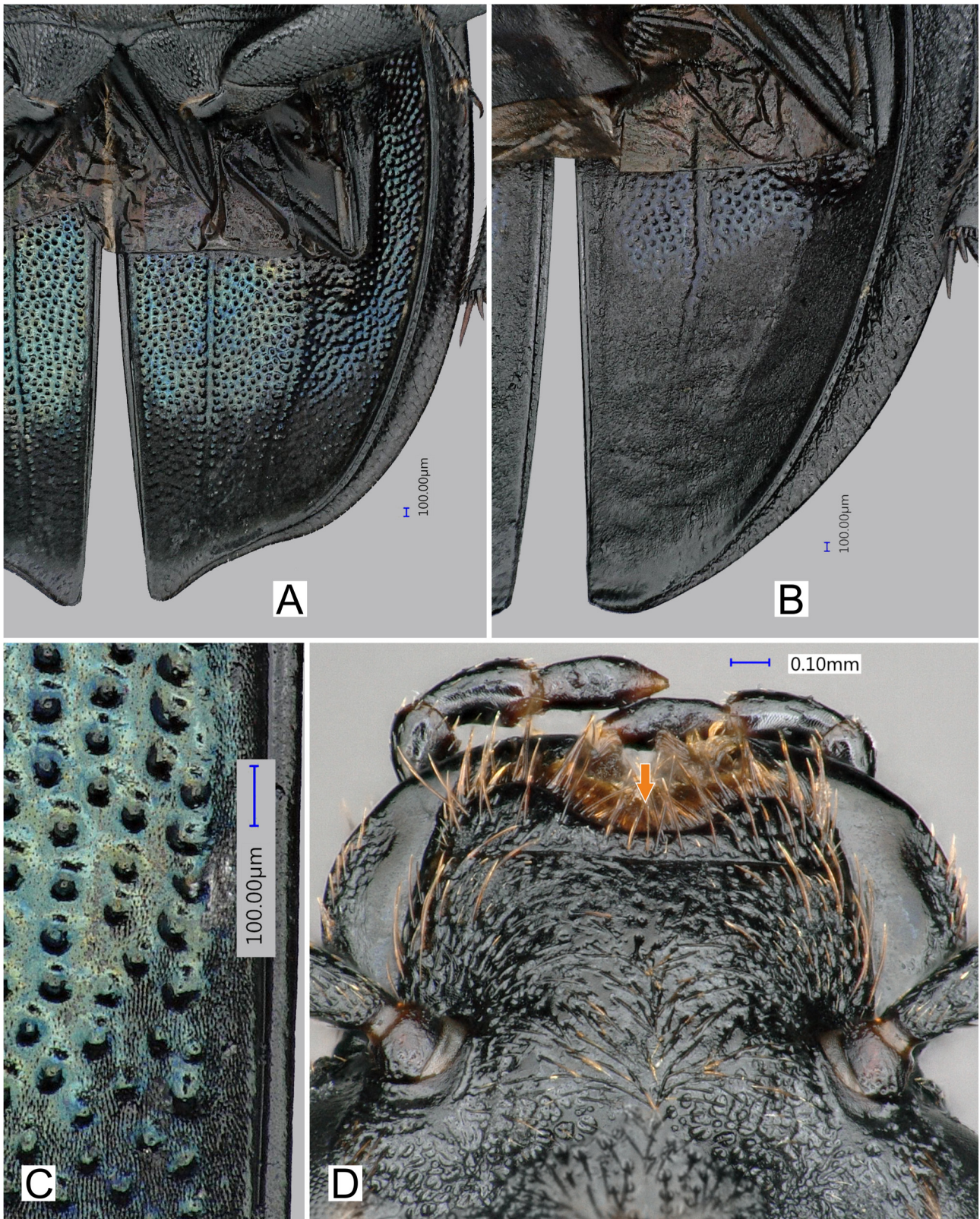


**FIGURE 6.** A–C. Scutellum of *Oiceoptoma* in dorsal view. D–F. Detail of right elytron of *Oiceoptoma* in dorsal view. A, D—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, Pinxi Creek, B, E—*O. subrufum* (Lewis, 1888), C, F—*O. nigropunctatum* (Lewis, 1888).

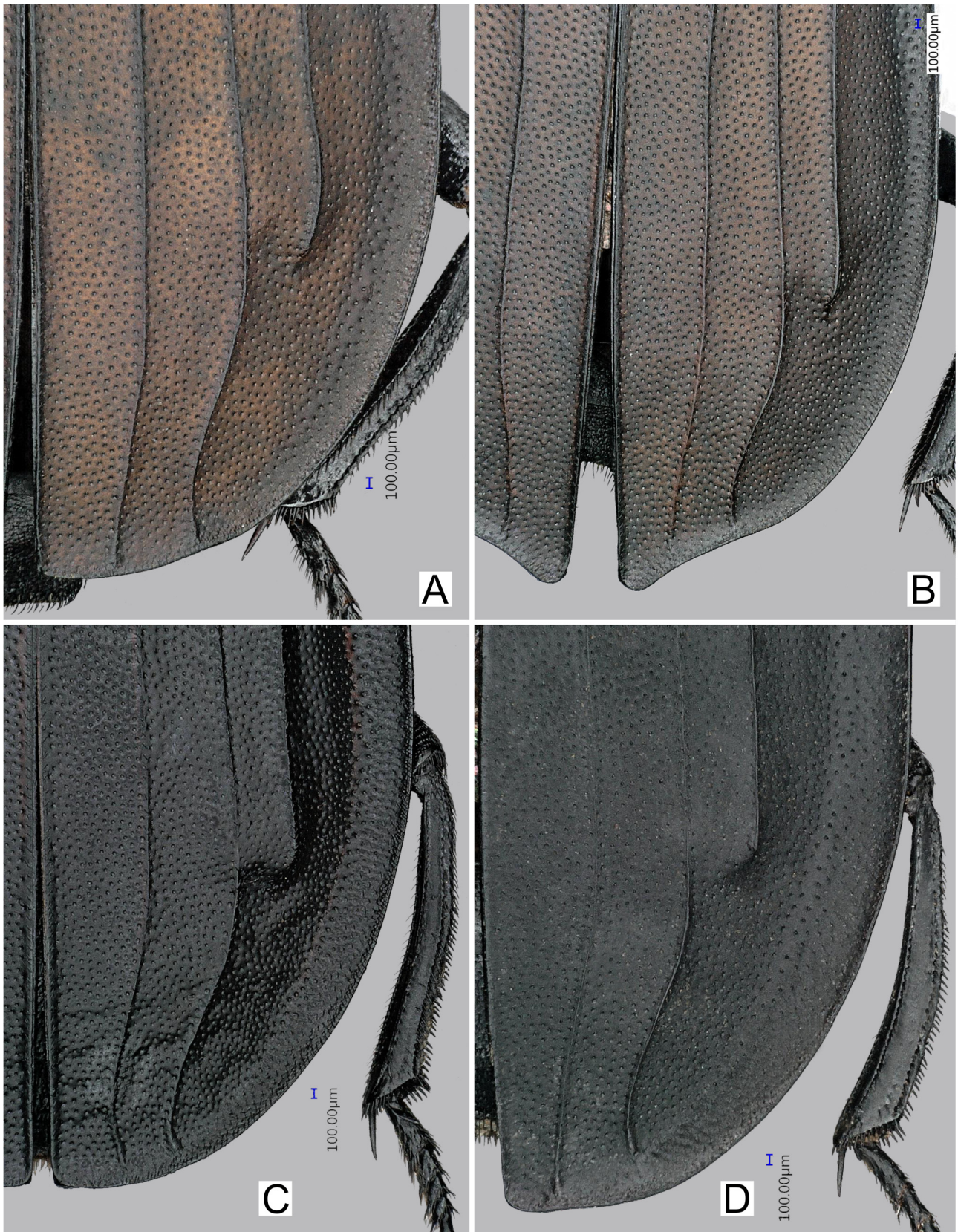




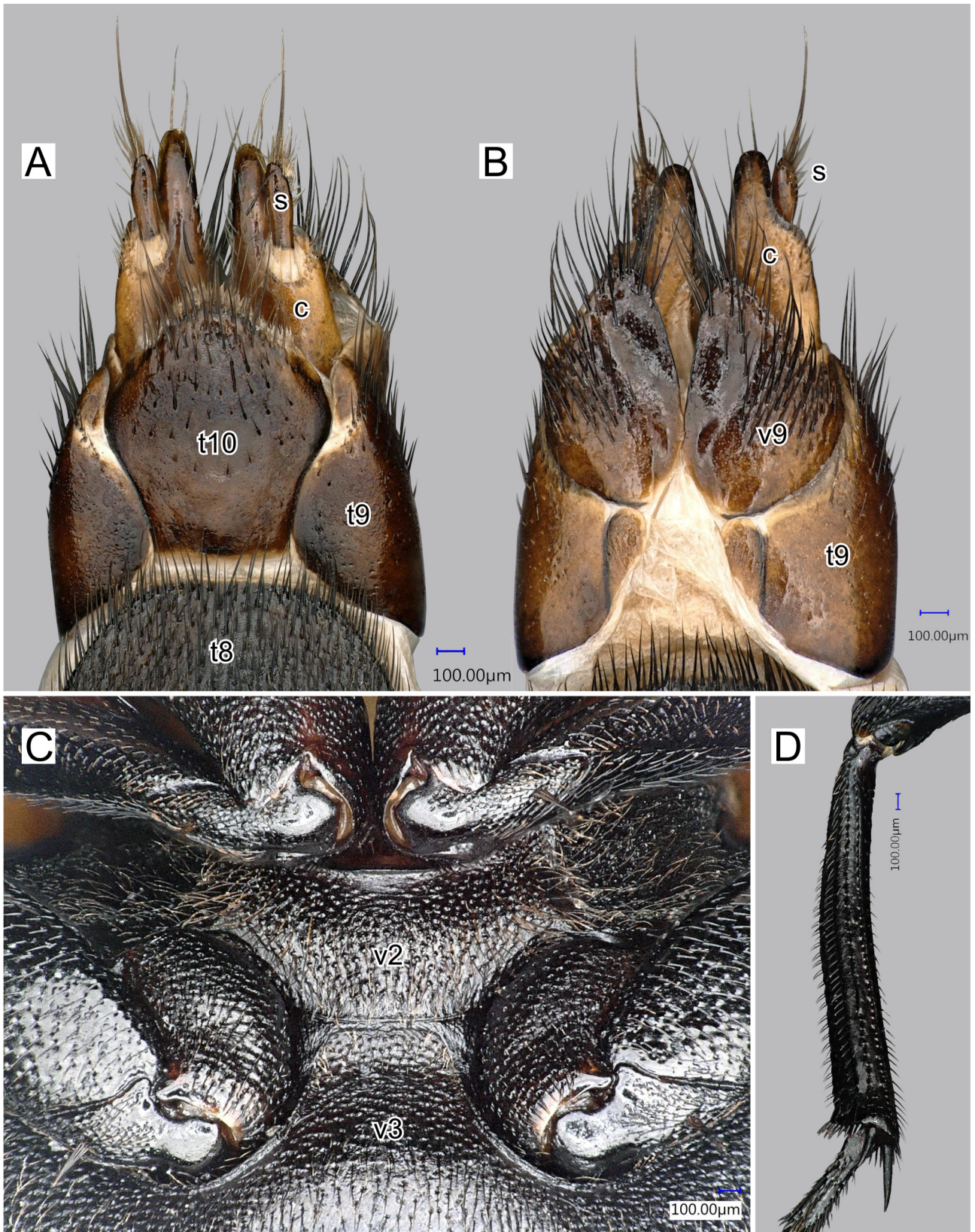
**FIGURE 7.** A–C. Antenna of *Oiceoptoma* in dorsal view. A–C—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, Pinxi Creek, D—*O. subrufum* (Lewis, 1888), E—*O. nigropunctatum* (Lewis, 1888).



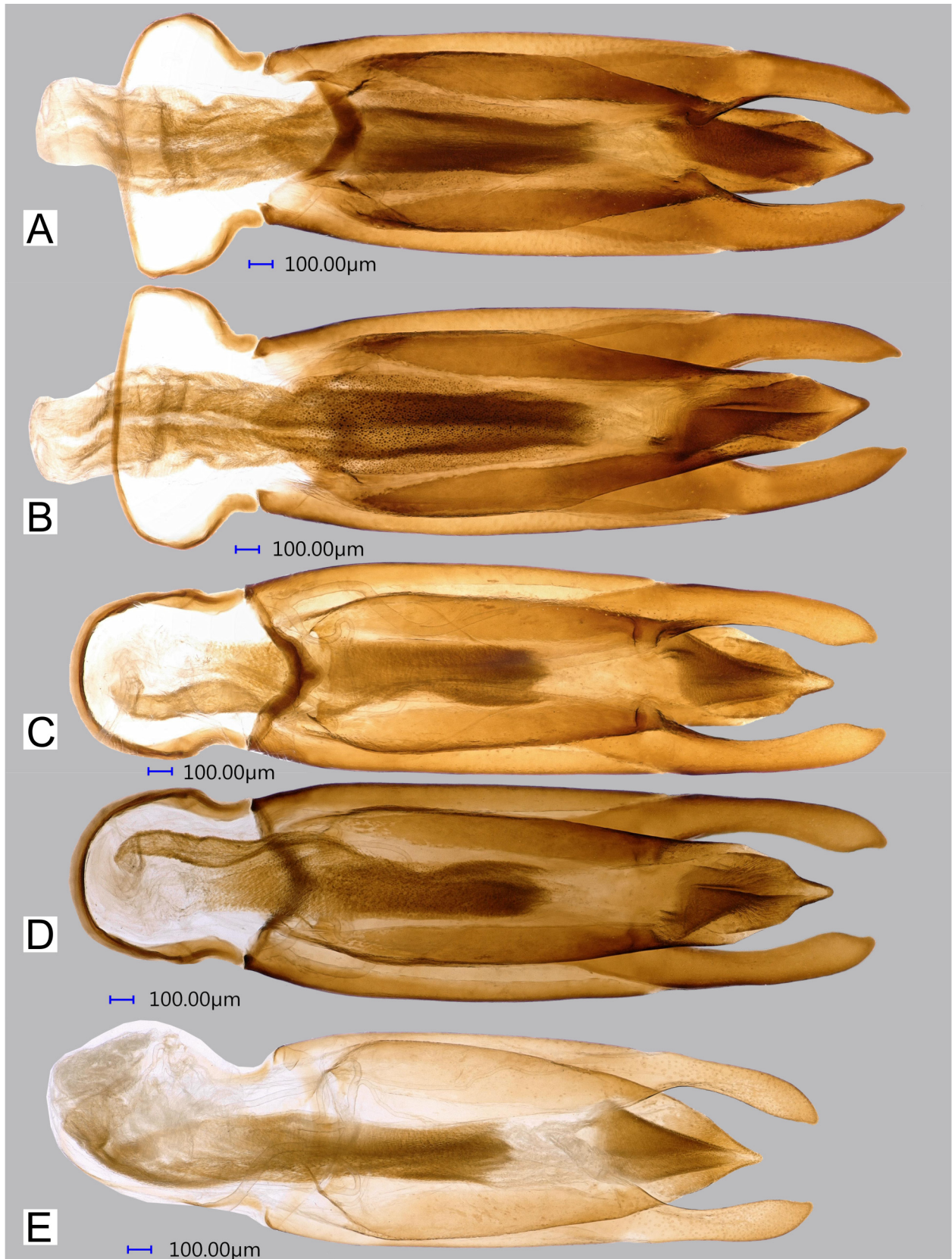
**FIGURE 8.** A, B. Left elytron of *Oiceoptoma* in ventral view. C. Detail of punctation on elytron of *Oiceoptoma* in ventral view. D. Head of *Oiceoptoma* in dorsal view. A, C, D—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, female paratype, Pinxi Creek. B—*O. subrufum* (Lewis, 1888). D—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, male holotype.



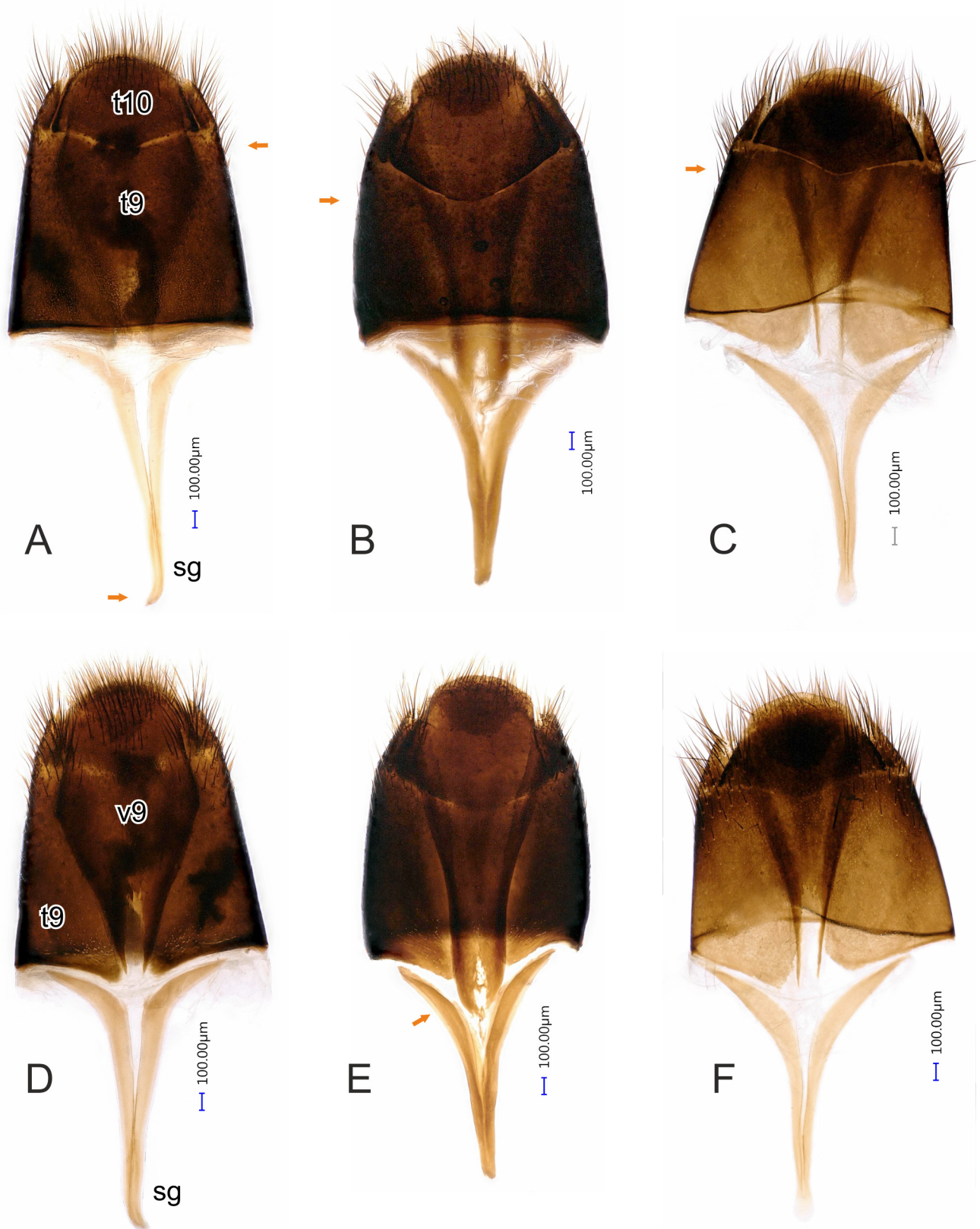
**FIGURE 9.** A–D. Right elytron of *Oiceoptoma* in dorsal view. A—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, male paratype, Pinxi Creek, B—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, female paratype, Pinxi Creek, C—*O. subrufum* (Lewis, 1888), male, D—*O. nigropunctatum* (Lewis, 1888), male.



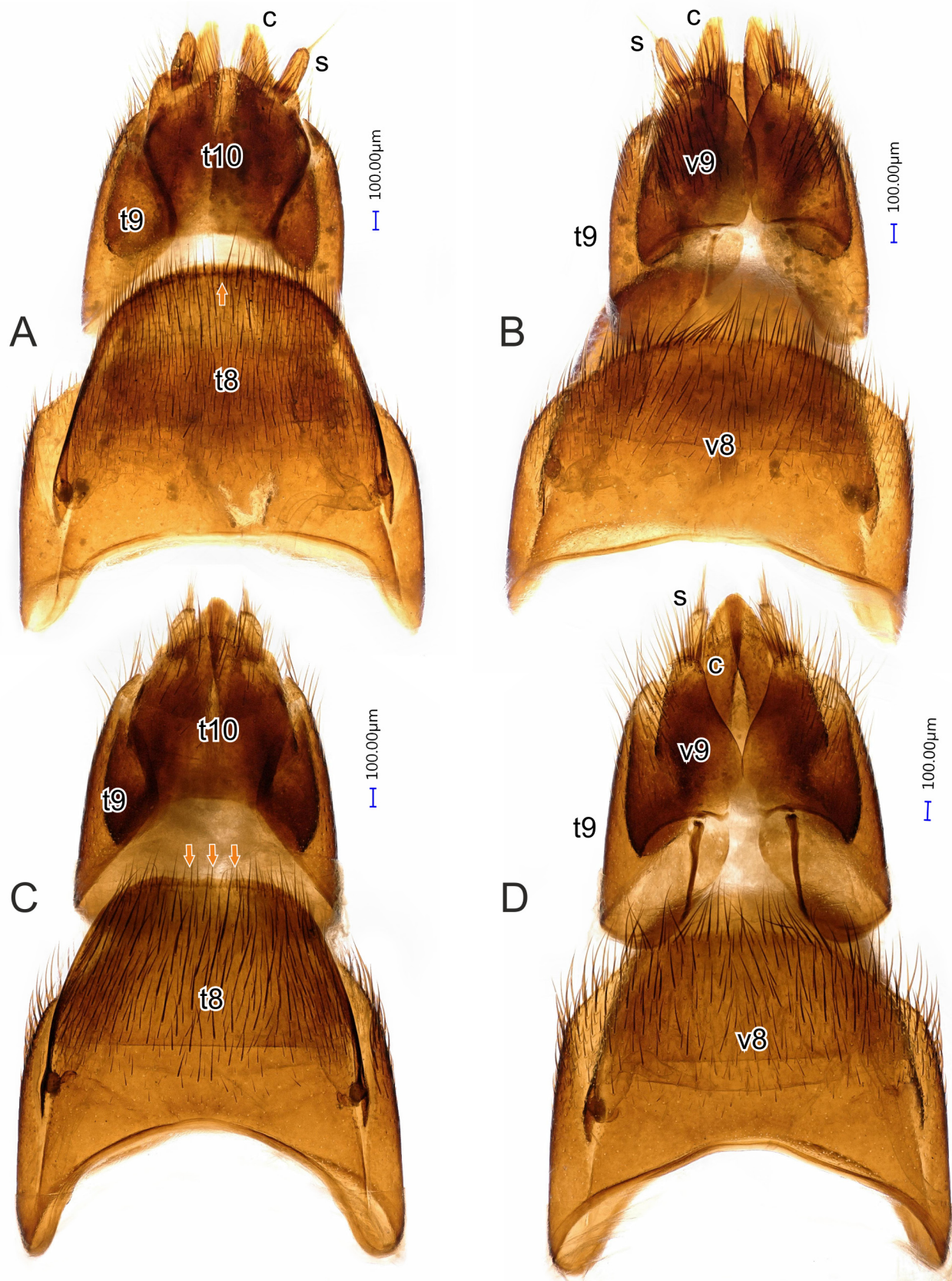
**FIGURE 10.** A, B. Female genitalia of *Oiceoptoma* in dorsal and ventral view. C—Mesothorax of *Oiceoptoma* in ventral view. D—Metatibia of *Oiceoptoma* in dorsal view. A–D—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, female paratype, Pinxi Creek. c—coxite, s—stylus, t8—tergum 8, t9—tergum 9, t10—tergum 10, v2—mesoventrite, v3—metaventrte, v9—ventrite 9.



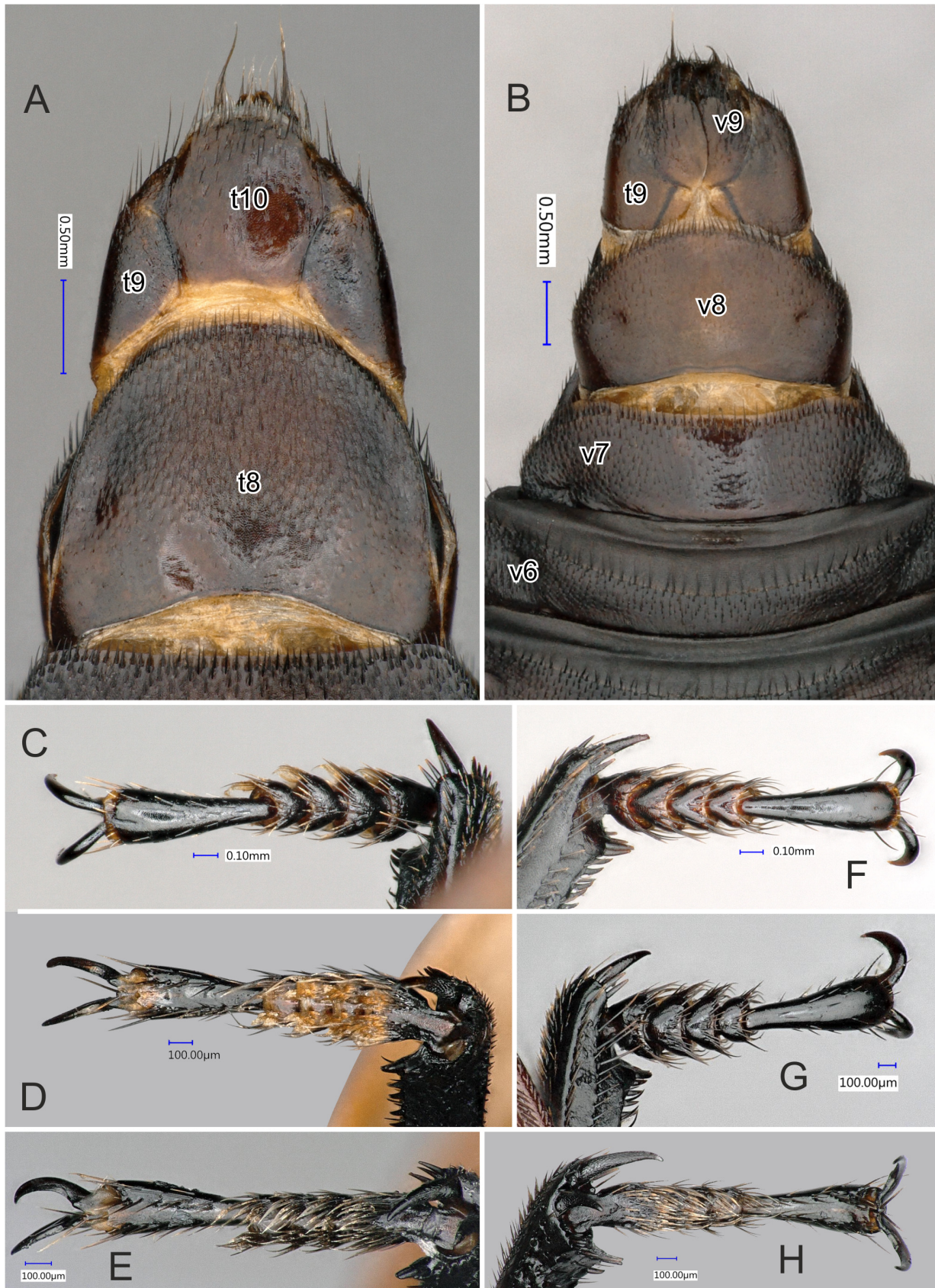
**FIGURE 11.** A–E. Aedeagus of *Oiceoptoma*. A, B—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, paratype, Pinxi Creek, ventral and dorsal view. C, D—*O. subrufum* (Lewis, 1888), ventral and dorsal view. E—*O. nigropunctatum* (Lewis, 1888), ventral view.



**FIGURE 12.** A–E. Male tergum 9 and 10 of *Oiceoptoma*. A, D—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, paratype, Pinxi Creek. B, E—*O. subrufum* (Lewis, 1888). C, F—*O. nigropunctatum* (Lewis, 1888). A–C—dorsal view, D–E—ventral view. sg—spiculum gastrale, t9—tergum 9, t10—tergum 10, v9—ventrite 9.

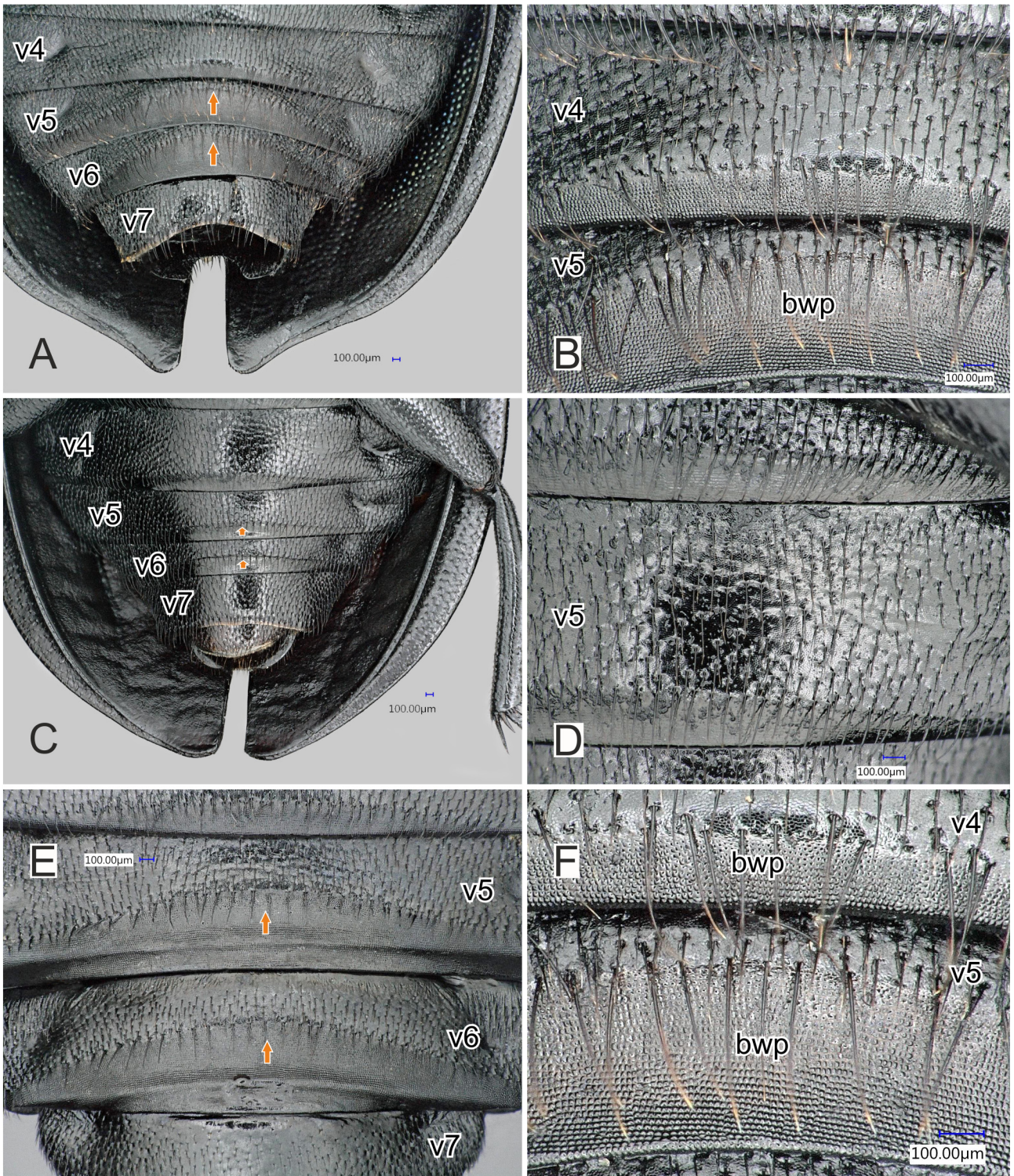


**FIGURE 13.** A–E. Female genitalia of *Oiceoptoma*. A, B—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, paratype, Pinxi Creek. C, D—*O. subrufum* (Lewis, 1888). A, C—dorsal view, B, D—ventral view. c—coxite, s—stylus, t8—tergum 8, t9—tergum 9, t10—tergum 10, v8—ventrite 8, v9—ventrite 9.



**FIGURE 14.** A–B. Female genitalia of *Oiceoptoma*. A, B—*O. nigropunctatum* (Lewis, 1888). A—dorsal view, B—ventral view. C–H. Protarsus of *Oiceoptoma*. C–E—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, holotype in dorsal view, paratypes (Pinxi Creek) in ventral view. F—*O. nigropunctatum* (Lewis, 1888). G, H—*O. subrufum* (Lewis, 1888). C, F, G—male, dorsal view. D—male, ventral view. E, H—female, ventral view. t8–10—tergum 8–10, v6–9—ventrite 6–9.





**FIGURE 15.** A–E. Female abdomen of *Oiceoptoma*, ventral view. A, B, F—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, paratype, Pinxi Creek. C, D—*O. subrufum* (Lewis, 1888). E—*O. nigropunctatum* (Lewis, 1888). bwp—brick-wall pattern, v4–v7—ventrite 4–7.

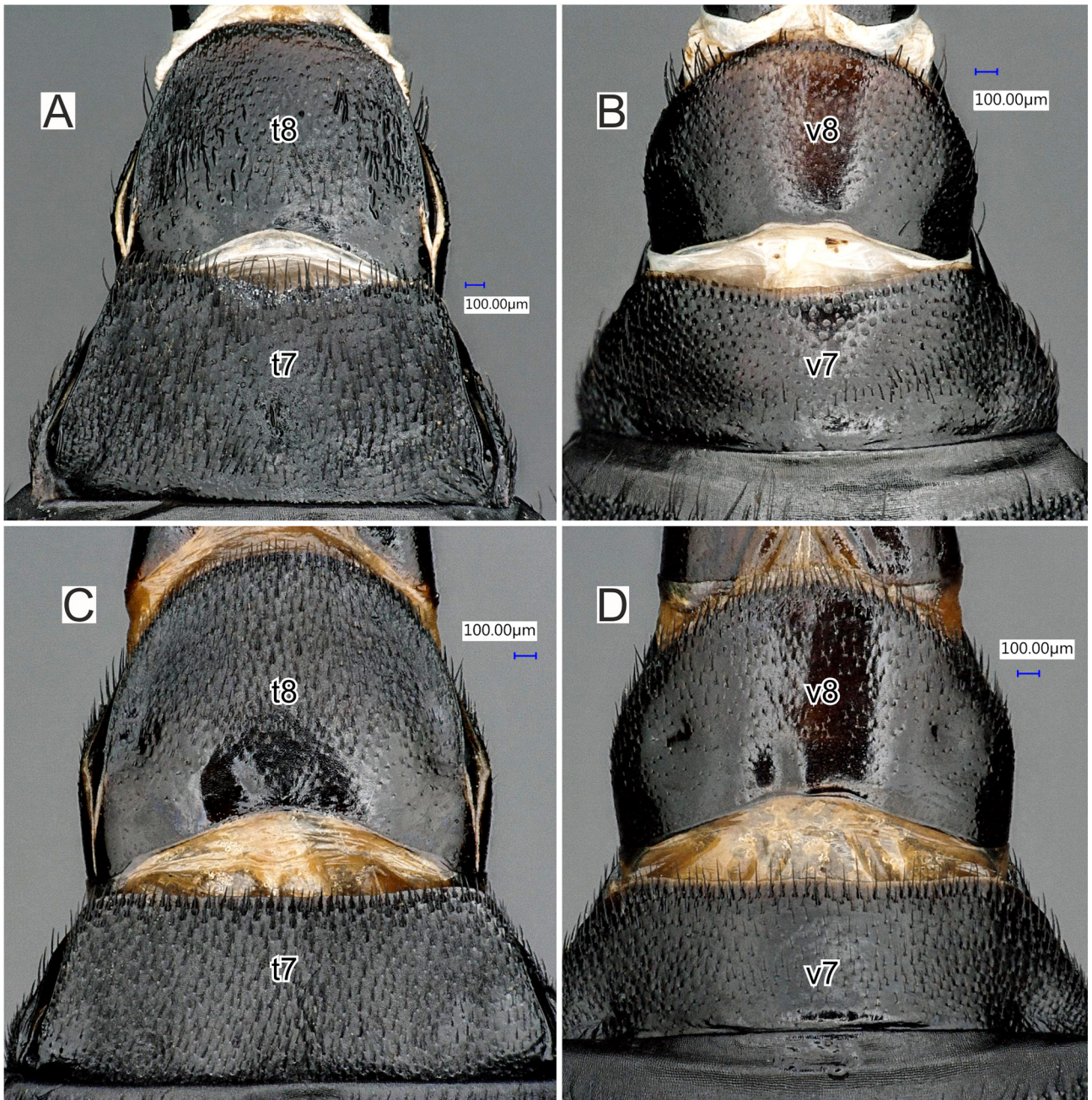
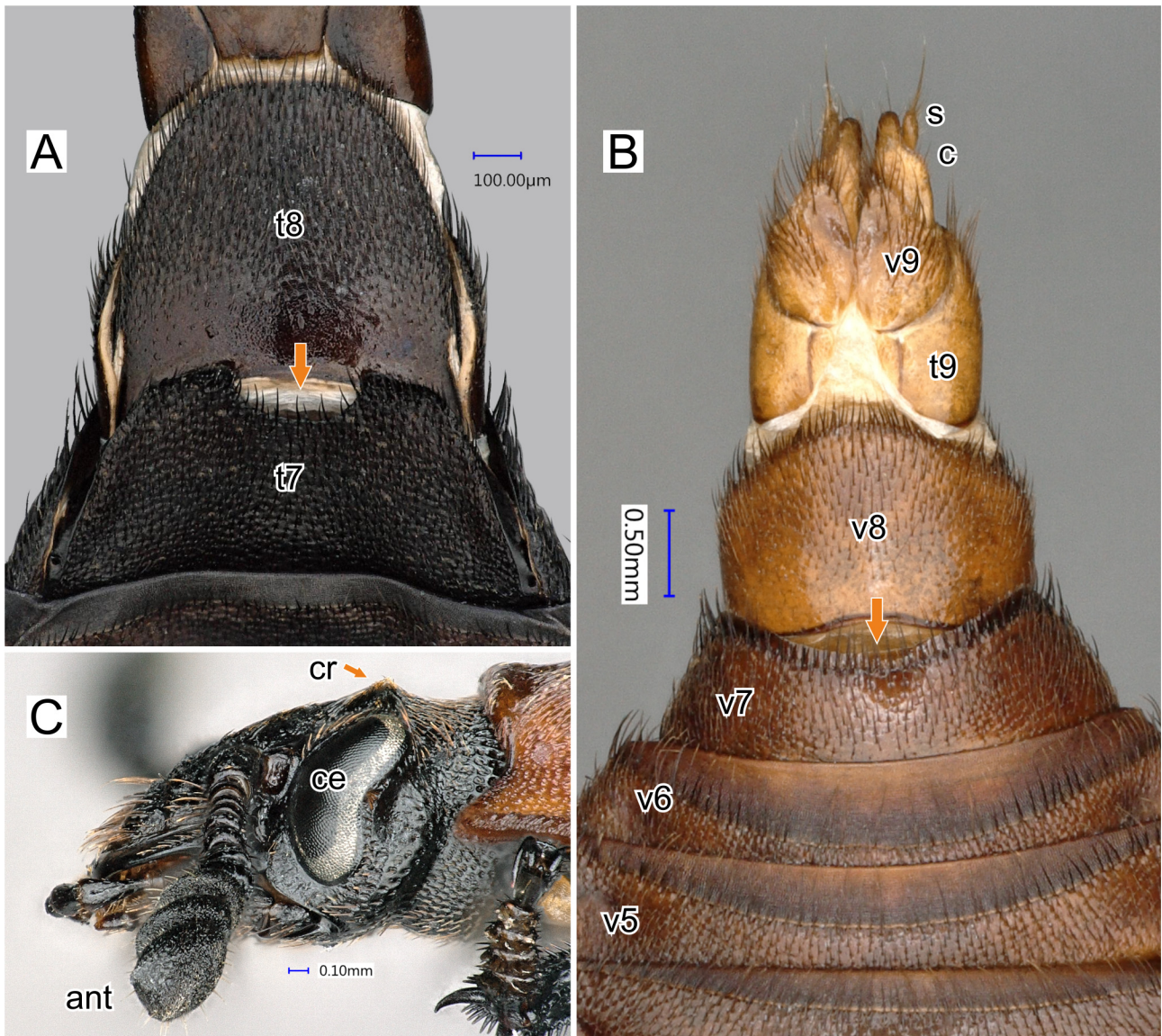
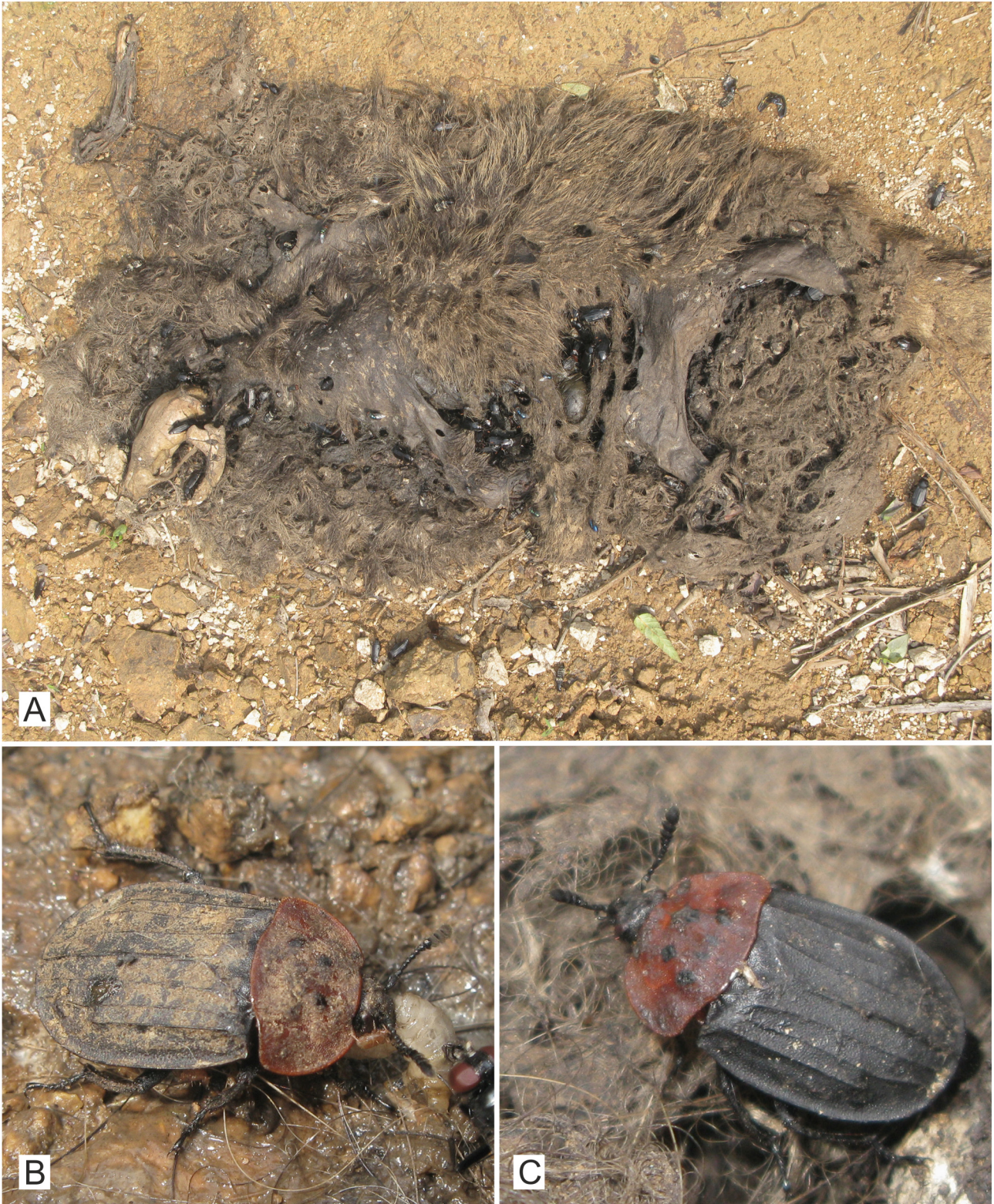


FIGURE 16. A–E. Female segments 7 and 8 of *Oiceoptoma*. A, B—*O. subrufum* (Lewis, 1888). C, D—*O. nigropunctatum* (Lewis, 1888). A, C—dorsal view, B, D—ventral view. t7—tergum 7, t8—tergum 8, v7—ventrite 7, v8—ventrite 8.



**FIGURE 17.** A–B. Female abdomen of *Oiceoptoma*, dorsal and ventral views. C. Head of *Oiceoptoma*, lateral view. A, B—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, female paratypes, Pinxi Creek. C—*O. tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, male holotype. ant—antenna, c—coxite, ce—compound eye, cr—crest, s—stylus, t7–9—tergum 7–9, v5–8—ventrite 5–9.



**FIGURE 18.** A–C. Vertebrate carrion at Pinxi Creek (A) and living specimens of *Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, **new species** (B, C). Photographs Jia-Yao Hu.



**FIGURE 19.** A–B. Habitat of *Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, on West Tianmushan, broadleaved deciduous forest with *Rhododendron*. Photographs Jan Růžička.

***Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, new species**

(Figs. 1A–F, 3D–F, 4A, D, 5A, D, 6A, D, 7A–C, 8A, C–D, 9A–B, 10A–D, 11A–B, 12A, D, 13A–B, 14 C–E, 15A–B, F, 17A–C)

*Oiceoptoma subrufum*: Růžička *et al.* 2004: 47 (misidentification).

**Type locality.** China, Zhejiang Province, Anji City, Longwangshan Mt., Pinxi Creek, 30°24'N, 119°27'E, alt. 1000–1100 m.

**Type material** (30 specimens). **Holotype**, ♂ (SNUC), “China: Zhejiang Prov. | Anji City | Longwangshan Mt. | Pinxi Creek | 30°24'N, 119°27'E || alt. 1000~1100 m | 09-VI-2012 | HU & YIN leg. [p]”. **Paratypes**, 6 ♂♂ 3 ♀♀ (SNUC), 1 ♂ 1 ♀ (BMNH), 2 ♂♂ 2 ♀♀ (JRUC), same data as holotype”; 2 ♂♂ 3 ♀♀ (SNUC), “China, Zhejiang Prov. | Anji County | Shenxi | 30° 25' N, 119° 24' E || alt. 400 m, 07-VI-2012 | ZHU Jian-Qing leg. [p]”; 1 ♀ (EUMJ), “中国 [= China] 浙江省 [= Zhejiang Prov.] 臨安市 [= Lin'an-shi] | 西天目山 [= Mt. West Tianmu Shan] | 6~11-V-1998 | 李 李珍 [= Li-Zhen Li] 採集 [= leg.] [p]”; 1 ♀ (SNUC), “16~20-V-20 [p] 06 [hw] | 西天目山 [= Mt. West Tianmu Shan] 臨安 [= Lin'an-shi] [hw] | 浙江 [= Zhejiang Prov.] Bwx [hw] || Mt. w. Tianmu | 16~20. V, 2006 | Bi Wen-xuan leg. [hw]”; 1 ♂ (SNUC), “West Tianmushan | Lin'an County | 11~15-VI-2006 | alt. 300–400 m | HU & TANG leg. [p]”; 1 ♀ (SNUC), “China: Zhejiang Prov. | Lin'an City | Mt. West Tianmu | alt. 300~500 m | 29-V~3-VI-2010 | Jian-Qing ZHU leg. [p]”; 1 ♂ (JRUC, DNA voucher JRUC-SIL-0054), “**CHINA: Zhejiang Prov.**, | Lin'an County, **West | Tianmushan Nat. Res.**, | 250 m NW of **Original | Temple of Lion Sect**, | 30.3431°N 119.4316°E, | J. Hájek & J. Růžička leg. || (**WT10**) 2.–6.vii.2017; || 1165 m, **baited pitfall | traps #06** (fish meat, | ripening cheese), broad- | leaved deciduous forest | with *Rhododendron* [p]”; 2 ♀♀ (JRUC, DNA vouchers JRUC-SIL-0010, JRUC-SIL-0011), “**CHINA: Zhejiang Prov.**, | Lin'an County, **West | Tianmushan Nat. Res.**, | 250 m NW of **Original | Temple of Lion Sect**, | 30.3431°N 119.4316°E, | Cheng-Bin Wang leg. || (**WT10**) 2.–6.vii.2017; || 1165 m, **baited pitfall | traps #06** (fish meat; alcohol, vinegar + sugar), broad- | leaved deciduous forest | with *Rhododendron* [p]”; 2 ♂♂ (JSCC), “NW. CHINA | TIENMUCHAN [without date and collector's name, hw with a pencil] || **Oiceoptoma | subrufum** | (Lewis, 1888) ♂ | Jan Růžička det. 200[p]3[hw]”.

**Description.** Male (Figs. 1A–C). Body oval, dorso-ventrally flattened. Pronotum orange with four black spots (Fig. 4A). Elytra light to dark brown. Head, antennae, legs and ventral part of body black. Flight wings fully developed, functional (Fig. 8A).

**Head.** Black, lustrous surface with regular punctation (Fig. 3D). Covered with short, recumbent orange setation. Clypeus anteriorly widely notched (Fig. 8D). Anterior margin of clypeus with slightly irregular row of dense, long, orange setation in dorsal view. Eye kidney-shaped in lateral view (Fig. 17C). Head with short row of long erect setae behind eyes (Fig. 3D). Frons with marked dorsal tentorial pits and a transverse, elevated crest posteriorly (Figs. 3D, 17C). Maxilla with deeply punctuated cardo and base of stipes in ventral view, covered by long setae (Fig. 3E).

**Antennae.** Medium-sized, with last four antennomeres forming a distinct club (Figs. 7A–C).

**Pronotum** moderately transverse, widest posteriorly (Fig. 4A). Pronotal disc orange, medially with four black, vaguely delimited spots, arranged in symmetrical, trapezoidal pattern (Fig. 4A). Spots are regularly covered with fine, distinct punctures, bearing long, orange setation (Fig. 4D). Margin rimmed only in anterior half; anteriorly with wide, shallow excision, which is medially straight; anterior angles weakly elevated. Posterior margin slightly sinuous, weakly sinuate postero-laterally (Figs. 4A, 6A). Surface with dense punctation, punctures medium-sized, clearly separated, from disc to margin deeply impressed (Figs. 4A, 5D). Pronotum covered with longer, orange setation.

**Scutellum.** Irregularly triangular, widely vaulted medially. Surface with dense, distinct, homogenous punctation; covered with longer orange setation, semierect anteriorly and distinctly recumbent medially and posteriorly (Fig. 6A).

**Elytra** subparallel, at the widest point (along 2/3 of its length) wider than pronotum (Fig. 1A). Humerus with distinct denticle (Fig. 3F). Elytron with three distinctly elevated ridges; only first and second ridge reaching apex of elytron; external ridge shortest, reaching only two thirds of elytral length (Figs. 1A, 6D, 9A). Second ridge in last third slightly sinuous (Fig. 9A). Third ridge posteriorly terminated at apical callus (Fig. 9A). Ridges on both sides covered with a row of short, recumbent, black setae. Lateral margin of elytra strongly elevated only in anterior half, disappearing posteriorly. Apex of elytron regularly rounded (Figs. 1A, 9A). Basal part of elytra and humeri with short, recumbent, black setae (Fig. 3F). Surface dull, with isodiametric microsculpture (Figs. 6A, D); subapical sur-

face regularly flat, without rugosities; with dense, distinct, regular punctation; punctures clearly separated by spaces 1.0–1.5 times their own diameter (Figs. 6D, 9A). Elytra with distinct, subrectangular punctures, with bluish metallic lustre covering most of the surface in ventral view (Figs. 8A, C). Elytral epipleura sparsely, finely but distinctly punctured in ventral view (Fig. 8A).

*Ventrum* finely punctate, covered with short, recumbent, brown to black setation (Figs. 5A, 10C). Proventrite with dense punctation laterally; medially dark brown to black, laterally widely orange in ventral view (Fig. 5A). Mesocoxae widely separated (Fig. 10C). Abdominal ventrites with distinct impressions laterally in ventral view (Figs. 1B, 15A). Ventrite 6 extremely reduced in length medially, with expanded brick-wall pattern on intersegmental membrane (Figs. 15A–B, F).

*Legs*. Protarsomeres 1–4 only slightly expanded, covered with short, dense, yellow setation (Figs. 14C–D). Pro-, / meso- and metatibia with two apical spurs of different length (Figs. 14C–D). Metatibia almost straight, only very slightly curved in ventral view (Fig. 10D).

*Abdominal segments*. Tergite 10 relatively short in length (Fig. 12A). Ventrite 9 oval, elongate, anteriorly as long as tergite 9, constricted and deeply desclerotized medially in ventral view (Fig. 12D). Spiculum gastrale robust, elongate in ventral view (Fig. 12D).

*Aedeagus*. Median lobe stout, robust, gradually tapered to widely rounded, triangular apex (Figs. 11A–B). Internal sac heavily sclerotized, medial portion composed of a great number of very small, regular, rounded denticles; basal part containing two strips of elongate, slender denticles (Fig. 11B). Parameres robust, almost straight, longer than median lobe, subapically constricted with rounded apex (Figs. 11A–B). Basal portion widely oval, very narrow, markedly exceeding the width of aedeagus (Figs. 11A–B).

**Sexual dimorphism.** *Female*. Similar to male except for the following structures: Protarsus simple, basal protarsomere elongated (Fig. 14E). Apex of elytron elongated to a blunt tip (Figs. 1D–E, 8A, 9B). Tergum 7 with distinct, deep, narrow, U-shaped medial emargination (Fig. 17A). Tergum 8 subquadrate, regularly rounded posteriorly (Figs. 13A, 17A). Ventrite 8 widely transverse (Figs. 13B, 17B). Tergite 9 elongate, rounded; tergite 10 pentagonal, apex posteriorly regularly rounded with dense microsetae (Figs. 10A–B, 13A). Coxite laterally constricted on outer margin subapically in ventral view; stylus inserted lateroapically, its length slightly shorter than apex of coxite (Figs. 10A–B, 13A–B).

**Measurements.** Elytra length 5.81–6.82 mm in males (mean 6.30 mm; 6.27 mm in the holotype), 6.72–7.26 mm (mean 6.96 mm) in females; pronotum length 3.41–3.82 mm in males (mean 3.63 mm; 3.55 mm in the holotype), 3.50–3.81 mm (mean 3.62 mm) in females; pronotum width 5.62–6.66 mm in males (mean 6.07 mm; 5.92 mm in the holotype), 5.63–6.42 mm (mean 6.10 mm) in females.

**Variability.** Elytra mostly dark brown, light brown in some (probably subteneral) specimens. Spots on pronotum slightly differently delimited, being less separated from surrounding surface in some specimens.

**Differential diagnosis.** *Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, is similar and probably closely related to *O. nigropunctatum* and *O. subrufum*. All three species share the following combination of characters: (1) orange pronotum with relatively short pubescence; (2) four dark spots on pronotal disc; (3) dark brown/black elytra with narrow epipleura; and (4) absence of patchy velvet pattern on elytral dorsal surface (see Růžička *et al.* (2004) for more details).

The three species can be separated from each other using the character states listed in the modified key and in Table 1 below.

**Etymology.** Patronymic, named after Liang Tang (Shanghai, China), an enthusiastic specialist of staphylinoid beetles (Agyrtidae, Staphylinidae: Steninae, Scaphidiinae, Staphylininae, Omaliinae etc.), who first recognized this species was unnamed.

**Collecting circumstances.** The large type series was collected near Pinxi Creek on old large mammal carrion, together with numerous *Necrodes littoralis* (Linnaeus, 1758) (Silphidae), *Creophilus maxillosus* (Linnaeus, 1758) (Staphylinidae) and some clown beetles (Histeridae) (Figs. 18A–C). Three specimens were also collected on West Tianmushan, 250 m above the Original Temple of Lion Sect, using fish-baited pitfall traps in a broadleaved deciduous forest with *Rhododendron* (Figs. 19A–B). The specimens were collected between May and the beginning of July.

**TABLE 1.** List of characters and character states separating the three related *Oiceoptoma* species.

Characters / Species	<i>O. subrufum</i>	<i>O. nigropunctatum</i>	<i>O. tangi</i> , new species
Male protarsi, ventral view	broadly expanded (Fig. 14G)	narrowly expanded (Fig. 14F)	narrowly expanded (Fig. 14C)
Spots on pronotum surface	diffuse median spot, usually composed of several scattered darker spots or almost indistinct (Figs. 4B, E)	four black distinct spots, arranged in a trapezoidal pattern; spots on pronotum distinctly delimited, smooth and glossy, only with sparsely distributed, minute punctures with very short setae (Figs. 4C, F)	four black distinct spots, arranged in a trapezoidal pattern; spots on pronotum vaguely delimited, regularly covered with fine, distinct punctures, covered by long, orange setation (Figs. 4A, D)
Pronotum, medial part of anterior margin in dorsal view	weakly dorsally elevated (Fig. 4B)	distinctly dorsally elevated (Fig. 4C)	weakly dorsally elevated (Fig. 4A)
Pronotum, medial part of posterior margin in dorsal view	weakly sinuate (Fig. 4B)	straight (Fig. 4C)	distinctly sinuate (Fig. 4A)
Punctuation of pronotum, disc latero-posteriorly, in dorsal view	large punctures with longer setation (Fig. 5E)	convex, small granules with minute setation (Fig. 5F)	small punctures with shorter punctuation (Fig. 5D)
Proventrite: colouration and punctuation in ventral view	medially dark brown to black, laterally only narrowly orange; dense punctuation laterally (Fig. 5B)	completely dark brown to black; only minute, superficial punctuation laterally (Fig. 5C)	medially dark brown to black, laterally widely orange; dense punctuation laterally (Fig. 5A)
Punctuation of scutellum, dorsal view	heterogenous, more distinct medially than laterally (Fig. 6B)	homogenous, weak (Fig. 6C)	homogenous, distinct (Fig. 6A)
Punctuation of elytra, dorsal view	distinct, deep punctuation (Fig. 6E)	with very weak, superficial punctuation (Fig. 6F)	distinct, deep punctuation (Fig. 6D)
Surface structure, subapical part of elytra in dorsal view	surface with rugosities (Fig. 9C)	simple surface (Fig. 9D)	simple surface (Figs. 9A–B)
Surface structure, subapical part of elytra in ventral view	area with subquadrate punctures and blue metallic lustre limited to central part of elytra, apex granulate and black (Fig. 8B)	area with subquadrate punctures and blue metallic lustre limited to central part of elytra, apex granulate and black (as on Fig. 8B)	area with subquadrate punctures covers most of the elytra, area with blue metallic lustre wide, covering most of ventral side, only apical part black (Fig. 8A)
Apex of elytron, female	short, rounded (Fig. 2D)	short, rounded (Fig. 2E)	elongate into blunt tip (Figs. 1D, 9B)
Abdominal ventrites 5 and 6, female, sclerotization in ventral view	very long medially, posteriorly exposing only a shorter area of brick-wall pattern (Figs. 15C–D)	longer medially, posteriorly exposing only a shorter area of brick-wall pattern (Fig. 15E)	very short medially, posteriorly with long area of brick-wall pattern (Figs. 15A–B, F)
Abdominal tergite 7, female, dorsal view	very wide, weak, V-shaped emargination (Fig. 16A)	transverse, without emargination (Fig. 16C)	deep, narrow, U-shaped emargination (Fig. 17A)
Abdominal ventrite 7, female, posterior margin, ventral view	weak emargination (Fig. 16B)	transverse, without emargination (Fig. 16D)	deeper emargination (Fig. 17B)
Abdominal tergite 8, female, dorsal view	truncate posteriorly (Fig. 13C)	regularly rounded posteriorly (Fig. 14A)	regularly rounded posteriorly (Fig. 13A)

...Continued on the next page



TABLE 1. (Continued)

Characters / Species	<i>O. subrufum</i>	<i>O. nigropunctatum</i>	<i>O. tangi</i> , new species
Male genital segment, shape of spiculum gastrale in ventral view	short; more regularly bent posteriorly (Figs. 12B, E)	elongate; more regularly bent posteriorly (Figs. 12C, F)	elongate; suddenly bent posteriorly (Figs. 12A, D)
Male genital segment, shape of ventrite 9 in ventral view	elongate; wide in anterior part (Fig. 12E)	short; narrow in anterior part (Fig. 12F)	short; narrow in anterior part (Fig. 12D)
Basal portion of aedeagus	oval, robust, not exceeding the width of median lobe (Figs. 11C–D)	oval, less robust, not exceeding the width of aedeagus (Fig. 11E)	widely oval, very narrow, markedly exceeding the width of aedeagus (Figs. 11A–B)
Median lobe of aedeagus	subapically distinctly sinuous laterally, tapering to a widely rounded apex (Figs. 11C–D)	gradually tapered to a slender, sharp apex (Fig. 11E)	gradually tapered to widely rounded, triangular apex (Figs. 11A–B)

**Distribution.** So far known only from three localities (Longwangshan Mt., Shenxi, Tianmu Shan Mts.) in Zhejiang Province, China (Figs. 20–21).

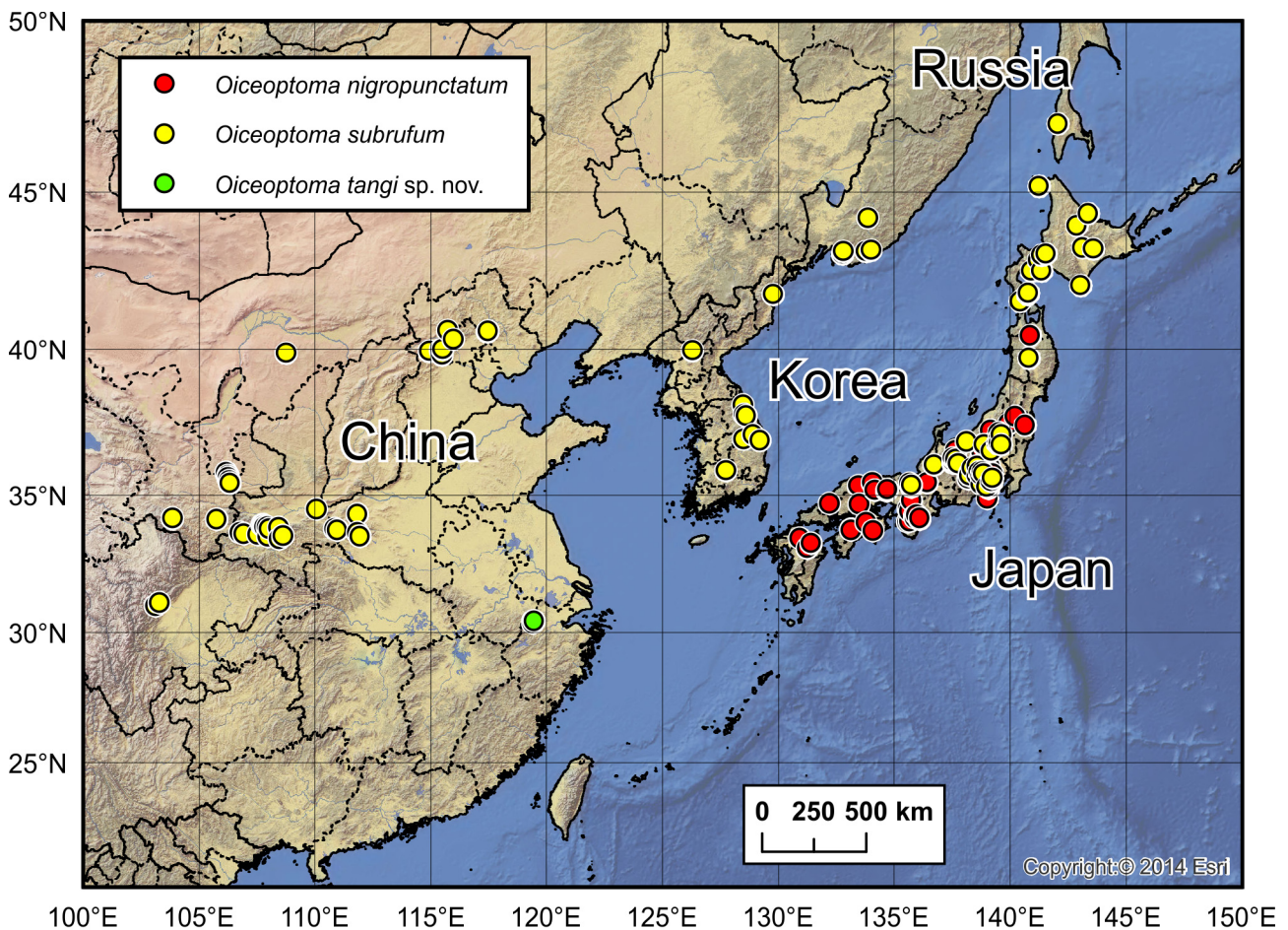
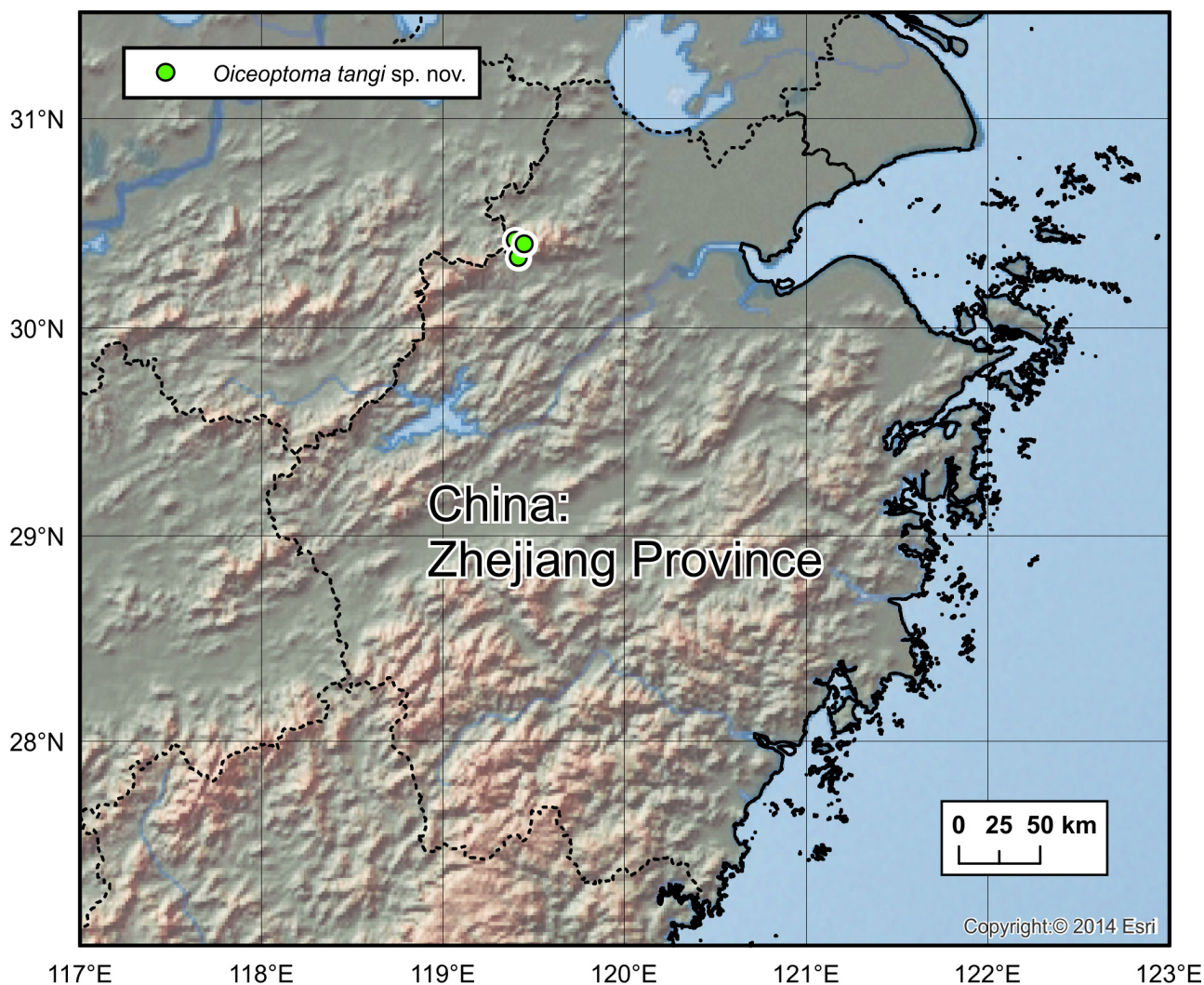


FIGURE 20. Distribution of *Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, new species (green), *O. nigropunctatum* (Lewis, 1888) (yellow) and *O. subrufum* (Lewis, 1888) (red).



**FIGURE 21.** Detailed distribution of *Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, in Zhejiang Province, China.

### Modified key to Palearctic *Oiceoptoma* (modified from Růžička *et al.* 2004)

The following couplets are modified to accommodate the newly described species.

5. Pronotum with diffuse median spots (usually composed of several scattered darker spots or almost indistinct, Figs. 4B, E). Scutellum more distinctly punctured medially than laterally (Fig. 6B). Elytra brown to black, subapical surface with rugosities (Figs. 2A, D, 9C). Male genital segment with ventrite 9 anteriorly distinctly longer than tergum 9 in ventral view (Fig. 12E).— Proventrite with dense punctation laterally; medially dark brown to black, laterally only narrowly orange in ventral view (Fig. 5B). Median lobe of aedeagus subapically distinctly sinuous laterally, tapering to a widely rounded apex (Figs. 11C–D). Basal portion oval, robust, not exceeding the width of aedeagus (Figs. 11C–D). Female tergum 7 posteriorly with wide, only weakly expressed emargination (Fig. 16A). Female tergum 8 truncate posteriorly (Fig. 13C). (Central and north-eastern China, Far East of Russia, Korean Peninsula to Japan). . . . . *O. subrufum* (Lewis)
- Pronotum with four black distinct spots, arranged in a trapezoidal pattern (Figs. 4A, C). Scutellum with homogeneous punctation (Figs. 6A, C). Elytra subapically with simple surface (Figs. 1A, D, 2E, 3A, 9A–B, D). Male genital segment with ventrite 9 anteriorly as long as tergum 9 in ventral view (Figs. 12D, F). . . . . **6**
6. Spots on pronotum distinctly delimited, smooth and glossy, only with sparsely distributed, minute punctures with very short setae (Figs. 4C, F). Proventrite with only minute, superficial punctation laterally; completely dark brown to black in ventral view (Fig. 5C). Elytra black (Figs. 2E, 3A, 6F, 9D). Apex of elytron short and rounded in female (Figs. 2E). Surface of scutellum and elytra with very weak, superficial punctation (Figs. 6C, F, 9D). Median lobe of aedeagus gradually tapered to a slender, sharp apex (Fig. 11E). Basal portion oval, less robust, not exceeding the width of aedeagus (Fig. 11E). Female tergum 7 posteriorly simple, without emargination (Fig. 16C). Female tergum 8 broadly truncate posteriorly (Fig. 14A). Female ventrites 5 and 6

longer medially, posteriorly exposing only a shorter area of brick-wall pattern (Figs. 14B, 15E). (Japan). . . . .

- *O. nigropunctatum* (Lewis)  
Spots on pronotum vaguely delimited, regularly covered with fine, distinct punctures, covered by long, orange setation (Figs. 4A, D). Proventrite with dense punctation laterally; medially dark brown to black, laterally widely orange in ventral view (Fig. 5A). Elytra light to dark brown (Figs. 1A, D, 6D, 9A–B). Apex of elytron elongated to blunt tip in female (Figs. 1D, 8A, 9B). Surface of scutellum and elytra with distinct, deep punctation (Figs. 6A, D, 9A–B), Median lobe of aedeagus gradually tapered to widely rounded, triangular apex (Figs. 11A–B). Basal portion widely oval, very narrow, markedly exceeding the width of aedeagus (Figs. 11A–B). Female tergum 7 posteriorly with narrow, deep emargination (Fig. 17A). Female tergum 8 regularly rounded posteriorly (Figs. 13A, 17A). Female ventrites 5 and 6 very short medially, posteriorly with long area of brick-wall pattern (Figs. 15A–B, F) (China: Zhejiang Province). . . . . *O. tangi* Sommer, Růžička, Nishikawa & Schneider, new species

## Discussion

*Oiceoptoma tangi* Sommer, Růžička, Nishikawa & Schneider, **new species**, is closely related to *O. nigropunctatum* and *O. subrufum*, and is currently known only from a small area in the north-western part of Zhejiang Province, China. Its range seems to be well-separated from the related species, *O. nigropunctatum*, endemic to Japan (except Hokkaido), and *O. subrufum*, distributed widely from Central China to the Korean Peninsula, Far East of Russia and Japan (known from Hokkaido and Honshu). However, since the phylogenetic relationships of species within the genus *Oiceoptoma* are unknown, this will be the subject of a future study.

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## References

- Agassiz, L. (1847) *Nomenclatoris Zoologici Index Universalis, continens Nomina Systematica Classium, Ordinum, Familiarum et Generum Animalium Omnium, tam Viventium quam Fossilium, secundum Ordinem Alfabeticum unicum disposita, adjectis Homonymiis Plantarum, nec non Variis adnotationibus et emendationibus*. Jent et Gassmann, Soloduri, viii + 393 + (2) pp.
- Anderson, R.S. & Peck, S.B. (1985) *The carrion beetles of Canada and Alaska (Coleoptera: Silphidae and Agyrtidae)*. *The Insects and Arachnids of Canada, Part 13*. Agriculture Canada, Ottawa, 121 pp.
- Ikeda, H., Kagaya, T., Kubota, K. & Abe, T. (2008) Evolutionary relationships among food habit, loss of flight, and reproductive traits: life-history evolution in the Silphinae (Coleoptera: Silphidae). *Evolution*, 62, 2065–2079.  
<https://doi.org/10.1111/j.1558-5646.2008.00432.x>
- Ikeda, H., Nishikawa, M. & Sota, T. (2012) Loss of flight promotes beetle diversification. *Nature Communications*, 3, 648.  
<https://doi.org/10.1038/ncomms1659>
- Ji, Y. (2012) *The Carrion Beetles of China (Coleoptera: Silphidae)*. China Forestry Publishing House, Beijing, x + 309 + vii pp. [in Chinese, with English summary]
- Kirby, W. & Spence, W. (1828) *An Introduction to Entomology, or Elements of the Natural History of Insects, with Plates. Fifth Edition. Vol. 4*. Longman, Rees, Orme, Brown and Green, London, iv + 683 pp., pls. 21–30.  
<https://doi.org/10.5962/bhl.title.542>
- Leach, W.E. (1815) Entomology. In: Brewster, D. (Ed.), *Edinburgh Encyclopaedia, Volume 9. Part 1*. W. Blackwood, J. Waugh, J. Murray, Baldwin & Cradock, Edinburgh, pp. 57–172.
- Lewis, G. (1888) Notes on the Japanese species of *Silpha*. *The Entomologist, an Illustrated Journal of General Entomology*, 21, 7–10.
- Linnaeus, C. (1758) *Systema Naturae per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum Characteri-*

- bus, Differentiis, Synonymis, Locis. Tomus I. Editio Decima, Reformata.* L. Salvii, Holmiae, (4) + 823 + (1) pp.  
<https://doi.org/10.5962/bhl.title.542>
- Motschulsky, V. de (1858) Sur les collections coléoptérologiques de Linné et de Fabricius (continuation). *Études Entomologiques*, 7, 123–152.
- Newton, A.F. (2021) StaphBase: Staphyliniformia world catalog database. Version January 2021. In: Roskov, Y., Ower, G., Orrell, T., Nicolson, D., Bailly, N., Kirk, P.M., Bourgoin, T., DeWalt, R.E., Decock, W., Nieukerken, E., van Zárucchi, J. & Penev, L. (Eds.), *Species 2000 & ITIS Catalogue of Life, 20th February 2019*. Naturalis, Leiden. Digital resource. Available from: <http://www.catalogueoflife.org/col> (accessed 18 January 2021)
- Peck, S.B. (2001) 21. Silphidae Latreille, 1807. In: Arnett, R.H. & Thomas, M.C. (Eds.), *American Beetles. Vol. 1. Archostemata, Myxophaga, Adephaga, Polyphaga: Staphyliniformia*. CRC Press, Boca Raton, London, New York & Washington, pp. 268–271.
- Peck, S.B. & Kaulbars, M.M. (1987) A synopsis of the distribution and bionomics of the carrion beetles (Coleoptera: Silphidae) of the conterminous United States. *Proceedings of the Entomological Society of Ontario*, 118, 47–81.
- Portevin, G. (1903) Remarques sur les Nécropages du Muséum et description d'espèces nouvelles. *Bulletin du Muséum National d'Histoire Naturelle de Paris*, 9, 329–336.  
<https://doi.org/10.5962/bhl.part.25591>
- Portevin, G. (1920) Revision des Silphini et Necrophorini de la région Indo-Malaise. *Bulletin du Muséum National d'Histoire Naturelle de Paris*, 26, 395–401.
- Ratcliffe, B.C. (1996) The carrion beetles (Coleoptera: Silphidae) of Nebraska. *Bulletin of the University of Nebraska State Museum*, 13, 1–100.
- Růžicka, J. (2015) Silphidae. In: Löbl, I. & Löbl, D. (Eds.), *Catalogue of Palaearctic Coleoptera. Vol. 2/1. Hydrophiloidea-Staphylinioidea. Revised and Updated Edition*. Brill, Leiden & Boston, pp. 5 + 291–304.
- Růžicka, J., Háva, J. & Schneider, J. (2004) Revision of Palaearctic and Oriental *Oiceoptoma* (Coleoptera: Silphidae). *Acta Societatis Zoologicae Bohemicae*, 68, 30–51.