A journal of world insect systematics

INSECTA MUNDI

0913

Revision of the checkered beetle genus *Onychotillus* Chapin (Coleoptera: Cleridae: Tillinae)

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Robert E. Woodruff Festschrift Contribution
Date of issue: February 24, 2022

Center for Systematic Entomology, Inc., Gainesville, FL

Opitz W. 2022. Revision of the checkered beetle genus *Onychotillus* Chapin (Coleoptera: Cleridae: Tillinae). Insecta Mundi 0913: 1–16.

Published on February 24, 2022 by
Center for Systematic Entomology, Inc.
P.O. Box 141874
Gainesville, FL 32614-1874 USA
http://centerforsystematicentomology.org/

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Printed copies (ISSN 0749-6737) annually deposited in libraries

Florida Department of Agriculture and Consumer Services, Gainesville, FL, USA
The Natural History Museum, London, UK
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Electronic copies (Online ISSN 1942-1354) in PDF format

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0913: 1–16 **INSECTA MUNDI** 2022

Revision of the checkered beetle genus *Onychotillus* Chapin (Coleoptera: Cleridae: Tillinae)

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Abstract. The West Indian genus *Onychotillus* Chapin (Coleoptera: Cleridae: Tillinae) is revised and includes *O. androwi* Opitz, **new species**, *O. apiculus* Opitz, **new species**, *O. cinctipennis* (Chevrolat,1874), *O. cubana* de Zayas,1988, *O. dimidiatus* de Zayas,1988, *O. lineatus* Opitz, **new species**, *O. minutus* de Zayas,1988, *O. trinitatis* de Zayas,1988, *O. woodruffi* Opitz, **new species**, and *O. vittatus* Chapin,1945.

Key words. Taxonomy, West Indies, new species, key to species.

ZooBank registration. urn:lsid:zoobank.org:pub:78496742-E381-477E-BAA7-2D14868E6253

Introduction

Robert E. Woodruff was a consummate collector of insects, gems, and items of art. He was a superb taxonomist with a specialty in the beetle family Scarabaeidae. This contribution is dedicated to his memory.

The genus *Onychotillus* Chapin, 1945, was described as a monotypic genus. *Onychotillus* remained bi-typic until de Zayas (1988) described four new species from Cuba.

Materials and Methods

This study involves the structure of 32 adult specimens. Available males were dissected to determine aedeagal structure, and, to a lesser extent, to establish species assignment. Morphological criteria are used to determine species level discontinuities and I adhere to the biological species concepts as discussed by Standfuss (1896), Dobzhansky (1937), and Mayr (1963). Methods involving dissections, measurements, morphological terminology follow those described in Opitz (2010: 35). Brown (1956) was used to coin scientific names for new species. Abbreviations used in this treatise are defined as follows: EW/FW= eye width /frons width; PW/PL= pronotal width /pronotal length; EL/EW= elytral length along epipleural margin/greatest width across elytral disc. All measurements were made at 500x. Habitus photographs were taken with a Leica Z 16 APO microscope equipped with JVC KY-F75U-CCD camera and controlled by Syncroscopy Auto Montage software (Cambridge, United Kingdom). The SEM micrographs were produced with a Scanning Electron Microscope-S-3500N (Hitachi Science Systems, Ltd., Tokyo, Japan). Image stacks, involving the aedeagus, were taken with a Leica DM2500 compound scope with a 10x objective lens and a Leica DFC425 camera (Meyer Instruments, Houston, Texas, United Sates of America), and combined using Zerene Stacker.

Repositories of specimens. I used codens as noted in Arnett et al. (1993) to indicate repositories of specimens.

CMNH Carnegie Museum of Natural History, Invertebrate Zoology, 4400 Forbes Avenue, Pittsburgh, Pennsylvania 15213, USA (Robert Androw).

FDZC Fernando de Zayas collection, Cuba.

FSCA Florida State Collection of Arthropods, Division of Plant Industry/Entomology, Doyle Connor Building, 1911 SW 34th Street, Florida Department of Agriculture, Gainesville, Florida 32608-7100, USA (Paul E. Skelley).

MCZC Museum of Comparative Zoology, Harvard University, Entomology, 26 Oxford Street, Cambridge, Massachusetts 02138-2902, USA (Crystal Maier).

USNM United States Department of Agriculture, Systematic Entomology Laboratory, c/o National Museum of Natural History MRC 168, Washington, D.C. 20560-0165, USA (Floyd Shockley).

Key of the adults of *Onychotillus* Chapin species

Specimens of *Onychotillus* may be distinguished from the superficially similar species of *Callotillus* Wolcott by the antenna that is comprised of 11 antennomeres. In *Callotillus* the antennae are comprised of 10 antennomeres. Also, the funicular antennomeres are slightly oblong in specimens of *Onychotillus,* which is not the case in *Callotillus*.

1. Proximal half of elytral disc testaceous (Cuba) ..... ***Onychotillus dimidiatus* de Zayas**
— Proximal half of elytral disc not testaceous **2**

2(1). Elytral sutural margin yellow (Cuba) ..... ***Onychotillus cinctipennis* (Chevrolat)**
— Elytral sutural margin not yellow **3**

3(2). Epicranium partially yellow and partially black (Dominican Republic) ..... ***Onychotillus apiculus* Opitz, new species**
— Epicranium not partially black **4**

4(3). Pronotum with dark punctiform marking (Dominican Republic). ..... ***Onychotillus androwi* Opitz, new species**
— Pronotum without punctiform marking **5**

5(4). Elytra violaceous (Jamaica, Dominican Republic) **6**
— Elytra not violaceous (Cuba) **8**

6(5). Pronotum yellow (Dominican Republic) ..... ***Onychotillus lineatus* Opitz, new species**
— Pronotum black **7**

7(6). Base of femur and trochanter yellow, rest of leg black (Dominican Republic) ..... ***Onychotillus woodruffi* Opitz, new species**
— Entire leg brown (Jamaica) ..... ***Onychotillus vittatus* Chapin**

8(5). Legs testaceous ..... ***Onychotillus minutus* de Zayas**
— Legs black **9**

9(8). Elytral striae not reduced near apex ..... ***Onychotillus trinitatis* de Zayas**
— Elytra striae reduced near apex ..... ***Onychotillus cubana* de Zayas**

Systematic Account

Genus *Onychotillus* Chapin, 1945

Onychotillus Chapin 1945: 596. Corporaal 1950: 45.

Type species. *Onychotillus vittatus* Chapin 1945: 596.

Diagnosis. This tilline genus differs from other New World genera by an unguis that does not have an accessory tooth. Also, the primary and secondary elytral pubescence is arranged into striae. The extended form of the terminal antennomere is a characteristic that is found in other Tillinae, as in *Lecontella* Wolcott and Chapin.

Redecription. Size. Length 3.0–5.5 mm; 1.0–2.0 mm. Form (Fig. 16). Oblong rectangular. Vestiture. Dorsum profusely vested with short pubescence, elytral pubescence comprised of long vertical setae and shorter decumbent setae; elytral setae emerge from minute punctures. Head. Cranium subquadrate (Fig. 1, 3), frons much wider than width of eye; antenna comprised of 11 antennomeres (Fig. 2), last antennomere expanded; terminal maxillary palpus digitiform (Fig. 6), terminal labial palpus securiform; labrum not emarginate; gula large, transverse; post-gular process transverse (Fig. 4, 5). Thorax (Fig. 7). Pronotum oblong, expanded at middle 1/2; subapical depression faintly expressed; collar narrow; procryptosternum complete; pronotal projections approaching prointercoxal process; femora gradually increasing in diameter; tibia without carina; tarsal spur (Fig. 9); tarsus involves 4 pads, unguis bipartite (Fig. 8); 10 rows of elytral punctation (Fig. 10), punctation seriate. Abdomen. Pygidium transverse/scutiform; aedeagus feebly sclerotized, phallobasic apodeme rectangular, phallobase not lobed, phallobasic rod present, phallic apex adorned with cluster of spines (Fig. 23).

Distribution. Jamaica, Cuba, Dominican Republic.

Description of *Onychotillus* Species

Onychotillus androwi Opitz, new species

Figures 11, 21.

Type material. Holotype. Male. Type locality: Dominican Republic, Provincia de Independencia, Sierra de Neiba, just south of crest, 5 km NNW Angel Feliz, 1,780 m. A second label reads: 18.15N 71.47W, 13-15-XI-1999, Cloud Forest, J. Rawlins, D. Davidson, C. Young (CMNH).

Diagnosis. The last antennomere is particularly elongate. The pronotum is yellow, except there is a black spot near the anterior margin. Also, the elytra show a pale fascia at the middle and a slight setaceous line near the sutural margin. Lastly, there is a slight patch of setae at the elytral apex. These characteristics will distinguish the members of this species from congeners.

Description. *Size.* Length 5.7 mm; width 2.1 mm. *Form.* As in Fig. 11. *Color.* Clypeus yellow, rest of cranium mostly black; pronotum mostly yellow; elytra bluish, trochanter yellow, remainder of leg black. *Head.* Cranium finely punctate, frons much wider than length of pedicel; EW/FW 15/40. *Thorax.* Pronotum nearly glabrous, quadrate, slightly expanded at middle ½; subapical depression faintly expressed; collar narrow; PW/PL 73/70; elytra punctations striate, striae reduced near elytral apex; EL/EW 240/76; short elytral setae decumbent, long elytral setae recumbent. *Abdomen.* Aedeagus slightly sclerotized; phallus well defined (Fig. 21).

Distribution. This species is known from the Dominican Republic.

Etymology. The specific epithet, *androwi,* is a patronym that honors Robert Androw for his outstanding curatorial skills at Carnegie Museum.

Onychotillus apiculus Opitz, new species

Figures 12, 23.

Type material. Holotype: Male. Type locality: Dominican Republic, Provincia de Santiago, Mount Diego de Ocampo, 3,000-4,000, VIII-1938, Darlington (MCZC).

Diagnosis. As in the last species, the last antennomere is elongate. The yellow pronotum is highly setose. The elytra are minutely cribrate. Lastly, the slight patch of setae at the elytral apex is more prominent. These characteristics will distinguish the members of this species from congeners.

Description. *Size.* Length 6.0 mm; width 2.0 mm. *Form.* As in Fig. 12. *Color.* Clypeus yellow, rest of cranium mostly black, epicranium yellow; pronotum mostly yellow; elytra bluish; legs black. *Head.* Cranium finely punctate, frons much wider than length of pedicel; EW/FW 15/40. *Thorax.* Pronotum nearly glabrous, quadrate, slightly expanded at middle ½; subapical depression faintly expressed; collar narrow; PW/PL 75/75; elytra punctations striate, striae not reduced near elytral apex, elytral surface minutely cribrate; EL/EW 260/70; short elytral setae decumbent, long elytral setae recumbent. *Abdomen.* Aedeagus slightly sclerotized; phallobasic lobes well defined; phallus well defined; phallobasic apodeme rectangular, phallobasic rod present, phallic apex not adorned with cluster of spines (Fig. 23).

Distribution. This species is known from the Dominican Republic.

Etymology. The specific epithet, *apiculus,* is a Latin word that has the meaning "point".

Onychotillus cinctipennis (Chevrolat, 1874)

Figures 13, 22.

Type material. Type: Gender unknown. Type locality: Cuba (MNHN). Chevrolat did not specify as to the number of specimens that were involved in his description. A lectotype will need to be designated when materials are available for study.

Diagnosis. The elytral margins are yellow, the elytral disk is black. These characteristics will distinguish the members of this species from congeners.

Redescription. *Size.* Length 5.0 mm; width 2.0 mm. *Form.* As in Fig. 13. *Color.* Cranium and antenna black, prothorax yellow, but slightly infuscated, elytra outlined in yellow, elytral disc black, legs bicolorous, abdomen black.

Head. Cranium finely punctate, eyes prominent, frons much wider than length of pedicel; EW/FW 15/35. *Thorax.* Pronotum glabrous, oblong, minimally expanded at middle ½; subapical depression faintly expressed; collar narrow; PW/PL 60/60; elytra punctations striate, striae reduced near elytral apex; EL/EW 230/100; short elytral setae decumbent, long elytral setae recumbent. *Abdomen.* Aedeagus feebly sclerotized, phallobasic apodeme rectangular, phallobase not lobed, phallobasic rod present, phallic apex adorned with cluster of spines (Fig. 22).

Variation. *Size*. Length 4.8–5.0 mm; width 1.6–1.8 mm. Other than body size, the available specimens are quite homogenous.

Distribution. This species is known from Cuba. I examined three specimens from Buenos Aires, Trinidad Mountains, 14-VIII-1936, 2,500–3,500 feet, Darlington (MCZC).

Onychotillus lineatus Opitz, new species

Figure 14.

Type material. Holotype: Female. Type locality: Dominican Republic, Provincia de Santiago, San José de las Matas, VI-1938, 1,000–2,000 feet, Darlington (MCZC).

Diagnosis. The cranium and legs are bicolorous, the pronotum is yellow, the elytra are violaceous. These characteristics will distinguish the members of this species from congeners.

Description. *Size.* Length 5.7 mm; width 1.7 mm. *Form.* As in Fig. 14. *Color.* Antenna black, pronotum yellow, but pronotal collar slightly brown, legs bicolorous, elytra violaceous. *Head.* Cranium finely punctate, frons much wider than length of pedicel; EW/FW 15/40. *Thorax.* Pronotum finely punctate, oblong, expanded at middle ½; subapical depression faintly expressed; collar narrow; PW/PL 65/70; elytral punctations striate, striae not reduced near elytral apex; EL/EW 240/110; short elytral setae decumbent, long elytral setae recumbent. *Abdomen.* Aedeagus not available for study.

Distribution. This species is known from the Dominican Republic.

Etymology. The specific epithet, *lineatus,* is a Latin word that translates to "of a line".

Onychotillus minutus de Zayas, 1988

Figure 15.

Type material. Syntype series: 9 specimens. Type locality: Cuba, Provincia de Guantanamo, Yateras (FDZC). Zayas did not specify in his description which specimen should be the name bearer of this species. Until the specimens are available for study, a lectotype cannot be designated until statements can be made to positively identify the lectotype from the others (ICZN 1999, Article 74.7).

Diagnosis. Cranium, pronotum, legs flavotestaceous, antenna black, elytra brown. These characteristics will distinguish the members of this species from congeners.

Redescription. *Size.* Length 3.0 mm; width 0.7 mm. *Form.* As in Fig. 15. *Color.* Cranium, pronotum, legs flavotestaceous, antenna black, elytra and abdomen brown. *Head.* Cranium finely punctate, eyes prominent, frons much wider than length of pedicel; EW/FW 10/30. *Thorax.* Pronotum finely punctate, minimally expanded at middle ½; subapical depression faintly expressed; collar narrow; PW/PL 40/40; elytra punctations striate, striae reduced near elytral apex; EL/EW 150/70; short elytral setae decumbent, long elytral setae recumbent. *Abdomen.* Aedeagus not available for study.

Variation. *Size*. The available specimens are quite homogenous.

Distribution. This species is known from Cuba. I examined two specimens from the vicinity of Santiago de Cuba, Yaturita (FDZC).

Onychotillus vittatus Chapin, 1945

Figure 16.

Type material. Holotype: Gender unknown. Type locality: Jamaica, Parish of Saint Catherine, Great Goat Island, 23-IV-1941, on flower of spike *Agave sobolifera* Salm-Dyck (USNM). **Paratypes.** 17 specimens. Jamaica, Parish of

Saint Catherine, Great Goat Island, 23-IV-1941, on flower of spike *Agave sobolifera* Salm-Dyck (USNM). The 18 type specimens were not available for study. The description is based on a homotype specimen.

Diagnosis. The legs are completely brown. This characteristic will distinguish the members of this species from congeners.

Redescription. *Size.* Length 4.0 mm; width 1.5 mm. *Form.* As in Fig. 16 *Color.* Body purpurescent, elytra with feebly indicated transverse fascia. *Head.* Cranium finely punctate, eyes prominent, frons much wider than length of pedicel; EW/FW 10/35. *Thorax.* Pronotum finely transversely wrinkled, oblong, slightly expanded at middle ½; subapical depression faintly expressed; collar narrow; PW/PL 45/50; elytra punctations striate, striae not reduced near elytral apex; EL/EW 150/35; short elytral setae decumbent, long elytral setae recumbent. *Abdomen.* Aedeagus not available for study.

Distribution. I examined one homotype specimen from Jamaica, Bull Run, Saint Andrew Parish, 19-IV-1959, Farr and Sanderson (USNM).

Onychotillus woodruffi Opitz, new species

Figures 1–10, 17.

Type material. Holotype: Female. Type locality: Dominican Republic, Provincia de La Vega, La Cienega de Manabao. Park Hdqt., 3–5-VII-99, 3,000, elev., R. E. Woodruff, blacklight (FSCA). **Paratypes.** 7 specimens. Dominican Republic, Provincia de La Vega, La Cienega de Manabao. Park Hdqt., 3–5-VII-99, 3,000, elev., blacklight, R. E. Woodruff (FSCA, 6). Dominican Republic, Provincia de Santiago, Mount Diego de Ocampo, 3–4,000, IIV-1938, Darlington (MCZC, 1).

Diagnosis. The base of the femur and trochanter are yellow, the remainder of the is leg black. These characteristics will distinguish the members of this species from congeners.

Description. *Size.* Length 5.5 mm; width 1.8 mm. *Form.* As in Fig. 17 *Color.* Body bluish, trochanter yellow, remainder of leg black. *Head.* Cranium finely punctate, frons much wider than length of pedicel; EW/FW 15/40. *Thorax.* Pronotum finely transversely wrinkled, oblong, expanded at middle ½; subapical depression faintly expressed; collar narrow; PW/PL 65 /70; elytral punctations striate, striae reduced near elytral apex; EL/EW 250/100; short elytral setae decumbent, long elytral setae recumbent. *Abdomen.* Aedeagus not available for study.

Variation. *Size*. Length 4.0–5.0 mm; width 1.5–1.8 mm. Other than body size, the available specimens are quite homogenous.

Distribution. This species is known from the Dominican Republic.

Etymology. The specific epithet, *woodruffi,* is a patronym that honors Robert E. Woodruff for his many accomplishments in systematic entomology.

Species Minimally Defined

The Cuban Cleridae insect collection of Fernando de Zayas is not available for study. However, it is possible to glean some of the clerid characteristics described by de Zayas. The species discussed by de Zayas (1988) are minimally described, and are only based on the descriptions noted and the available illustrations provided. Therefore, I offer very abbreviated descriptions of the following *Onychotillus* species: *O. cubana* de Zayas, *O. dimidiatus* de Zayas, and *O. trinitatis* de Zayas.

Burke and Zolnerowich (2017: 138) redescribed *O. cubana* de Zayas in their publication of Tillinae. However, it is not known whether their redescription of *O. cubana* de Zayas represents a true specimen of that species. All the specimens of *Onychotillus,* and illustrations, which I am aware of fall into no more than 6.0 mm.

Onychotillus cubana de Zayas, 1988

Figure 18.

Type material. Holotype: Gender not known. Type locality: Cuba, Provincia de Granma, Pico Turquino (FDZC).

Diagnosis. Pronotum yellow, elytra dark blue.

Description. *Size*. 4.0 mm. *Form.* as in Fig. 18. *Color*. Antenna, cranium and legs black, pronotum yellow, elytra dark blue. *Head*. Finely wrinkled. *Pronotum*. Subapical depression faintly expressed; collar narrow. Elytra punctations striate, striae reduced near elytral apex.

Distribution. The type locality and Cabo Cruz, in Cuba (FDZC).

Onychotillus dimidiatus de Zayas, 1988

Figure 19.

Type material. Holotype: Gender not known. Type locality: Cuba, Provincia de Matanzas, Canasí (FDZC).

Diagnosis. Head, pronotum, and anterior ½ of elytral testaceous, posterior elytral ½ dark blue.

Description. *Size.* 8.0 mm. *Form.* as in Fig. 19. *Color*. Antenna and tibia black, femur mostly testaceous, elytra bicolorous *Head*. Finely punctate. *Pronotum*. Subapical depression faintly expressed; collar narrow. Elytra punctations striate, striae not reduced near elytral apex.

Distribution. The type locality, Canasí, in Cuba.

Onychotillus trinitatis de Zayas, 1988

Figure 20.

Type material. Holotype: Gender not known. Type locality: Cuba, Provincia de Granma, Las Villas (FDZC).

Diagnosis. Pronotum yellow.

Description. *Size.* 6.0 mm. *Form.* as in Fig. 20. *Color*. Mostly black, pronotum and scutellum yellow. *Head*. Finely punctate. *Pronotum*. Subapical depression faintly expressed; collar narrow. Elytra punctations striate, striae not reduced near elytral apex.

Distribution. The type locality, Las Villas, in Cuba.

Acknowledgments

I thank the curators of the various museums for entrusting me with the specimens in their charge. The reviews of Robert H. Turnbow, Jr. and John M. Leavengood, Jr. are highly appreciated. My wife Galena provided much support in the preparation of the AutoMontage and Leica images, and Jonathan Bremer prepared SEM images. My thanks to Paul Skelley for numerous department courtesies and to the Florida Department of Agriculture, DPI, for institutional affiliation and support.

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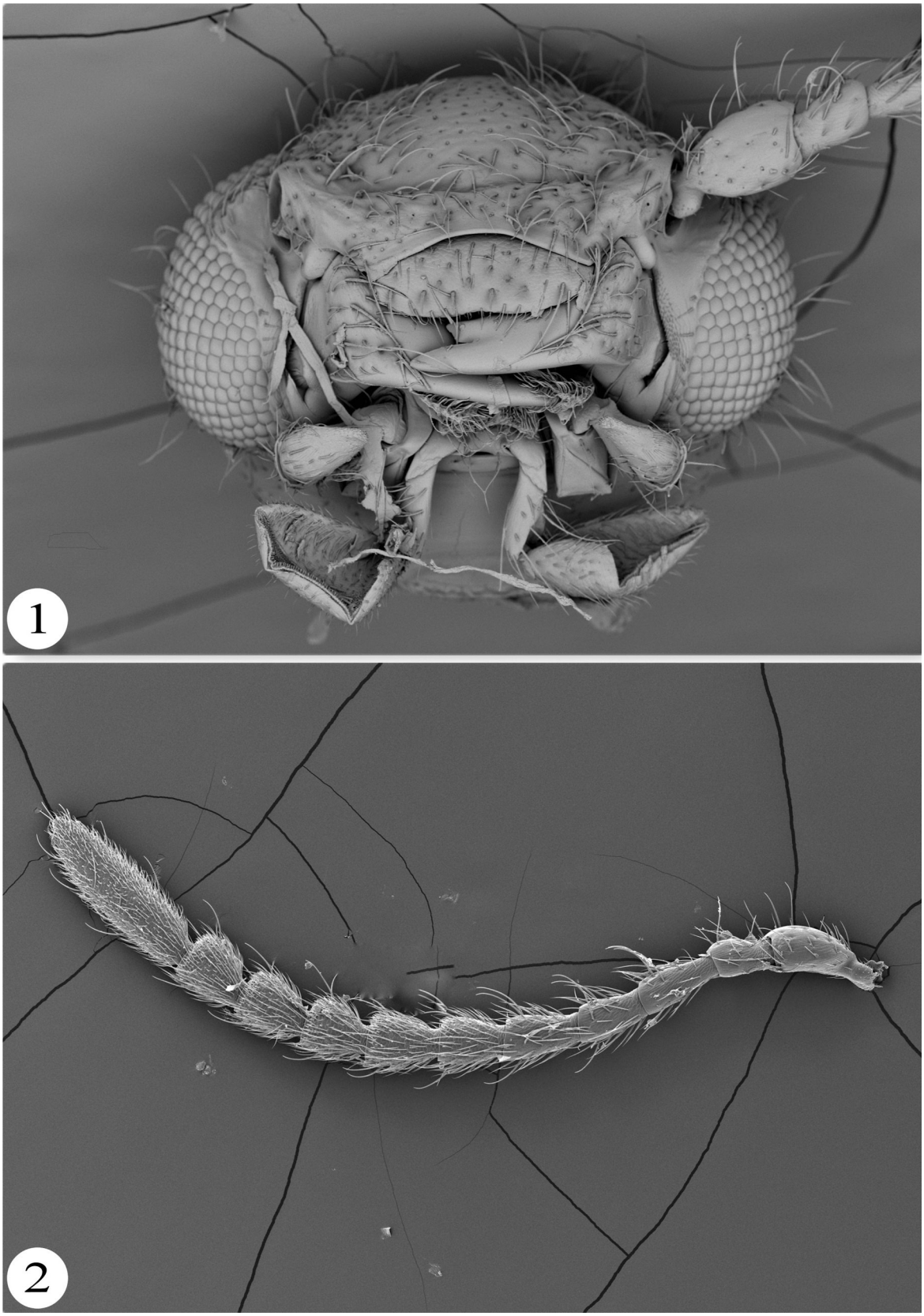
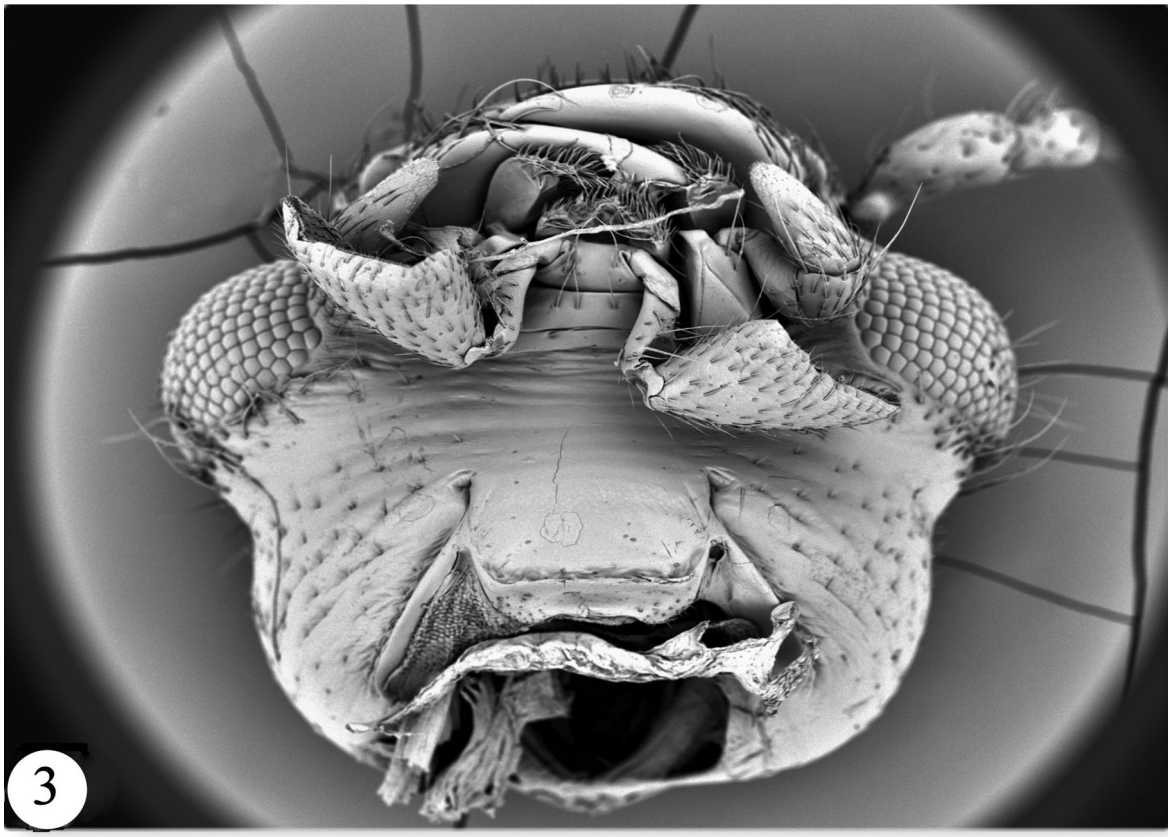
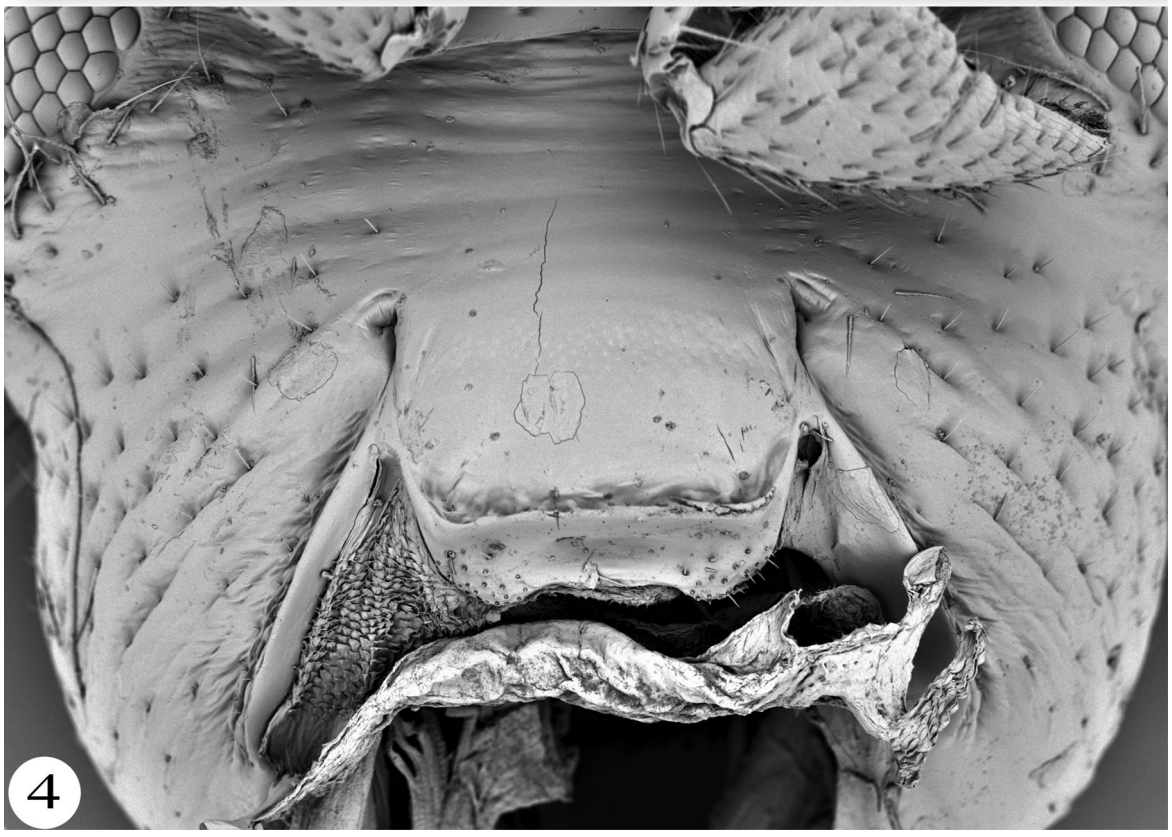
Received December 13, 2021; accepted December 29, 2021.
Review editor Oliver Keller.

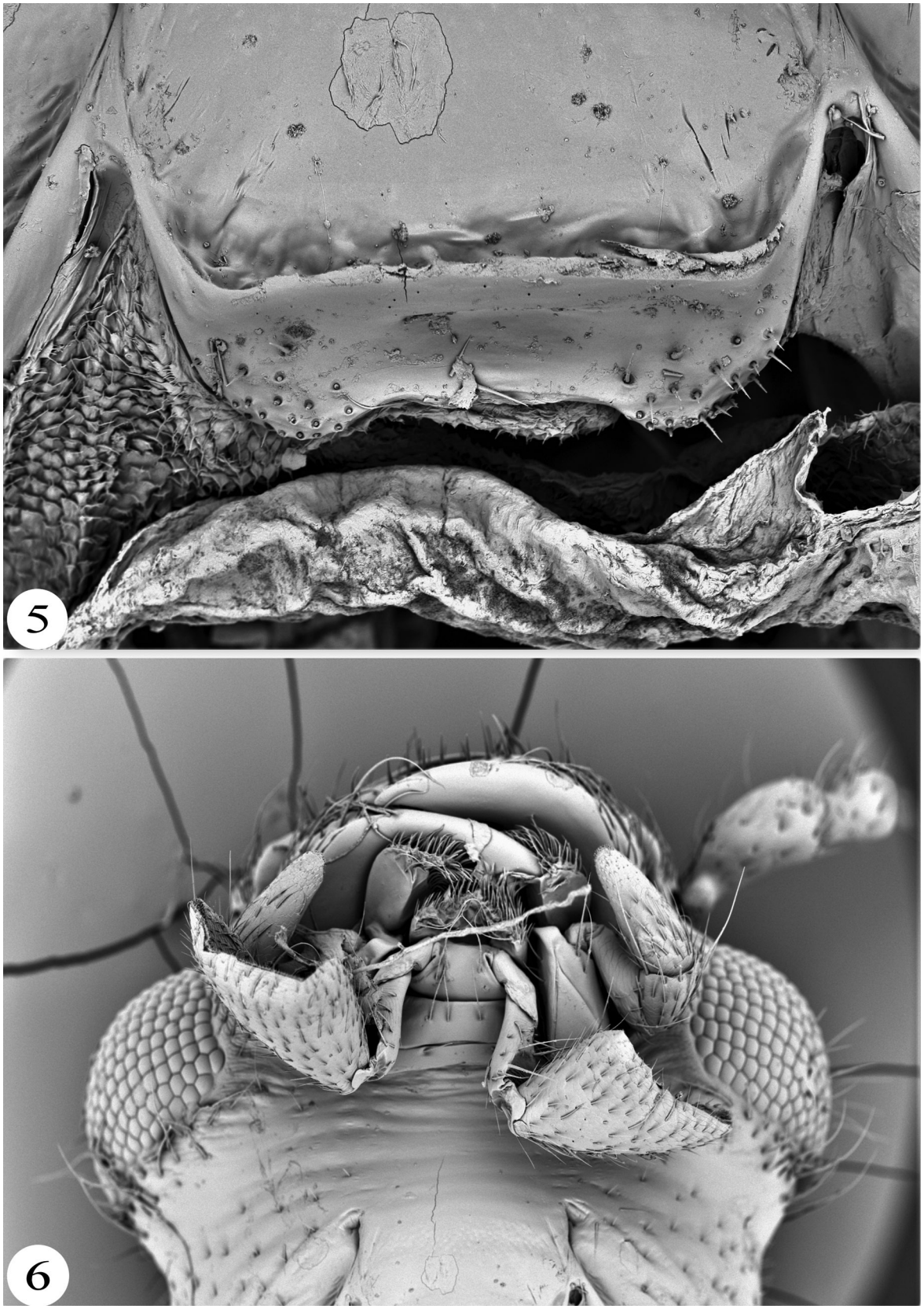


Figures 1–2. Structures of *Onychotillus woodruffi*. **1)** Head. **2)** Antenna.

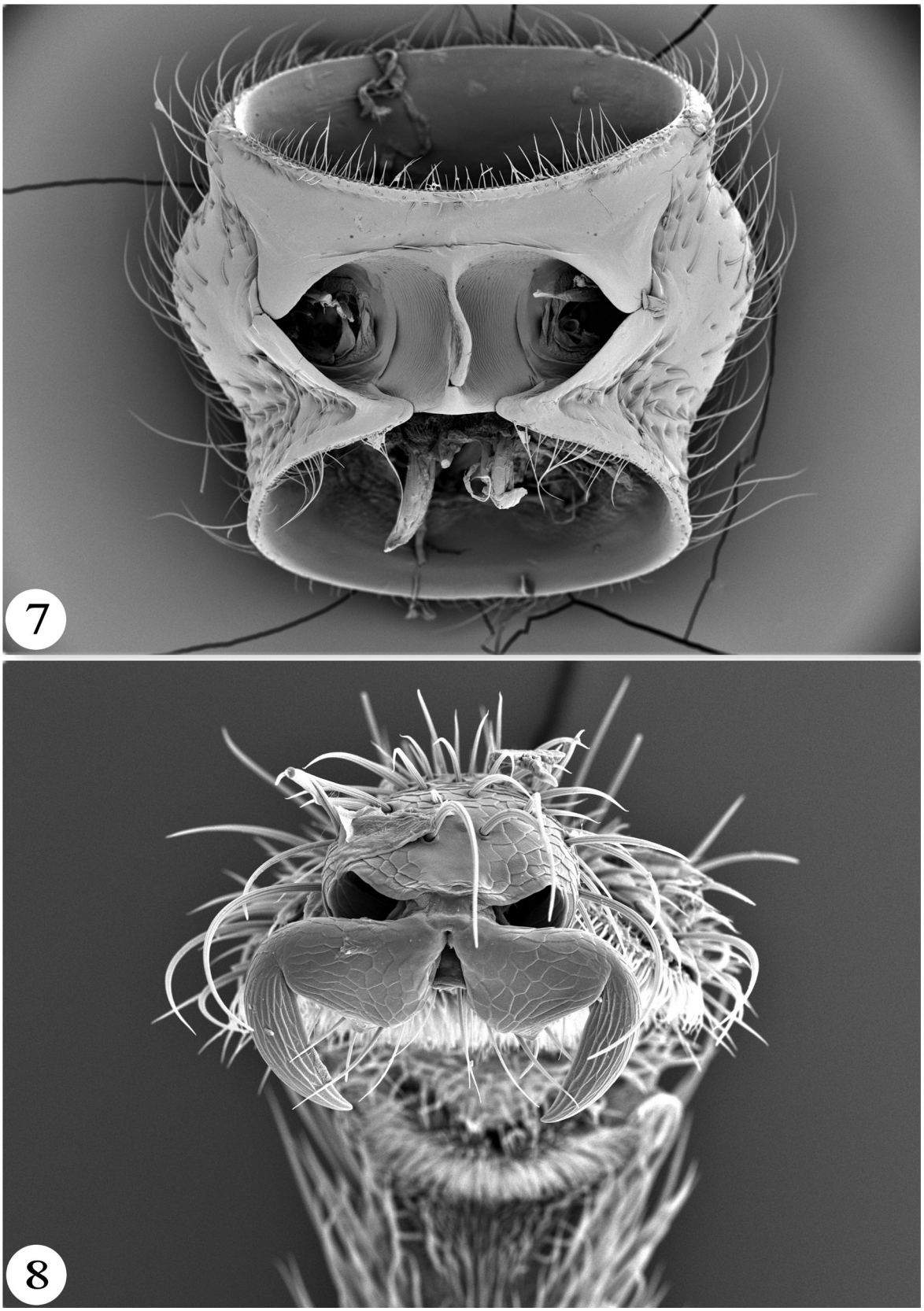




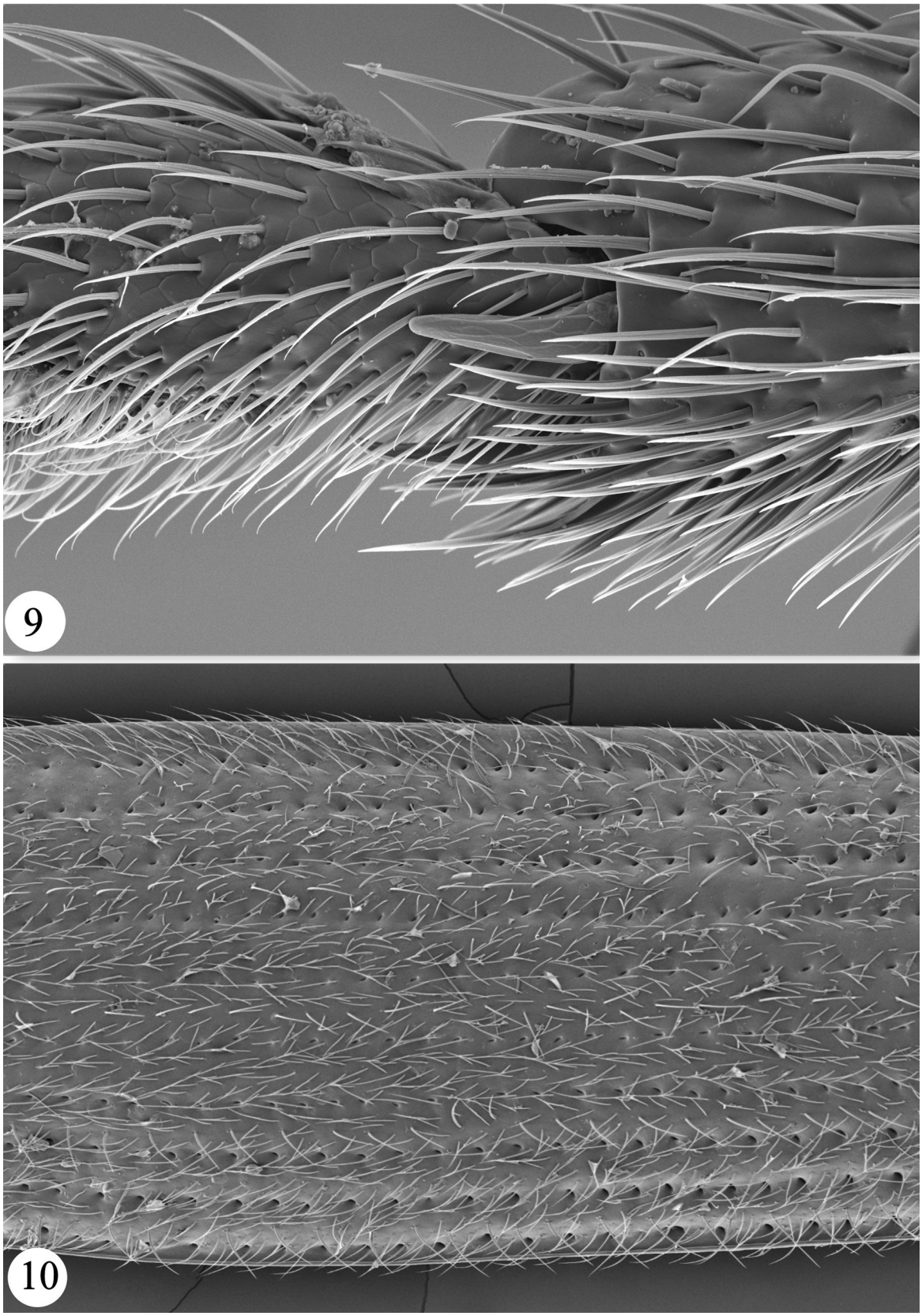
Figures 3–4. Structures of *Onychotillus woodruffi*. **3)** Head. **4)** Post-gular process.



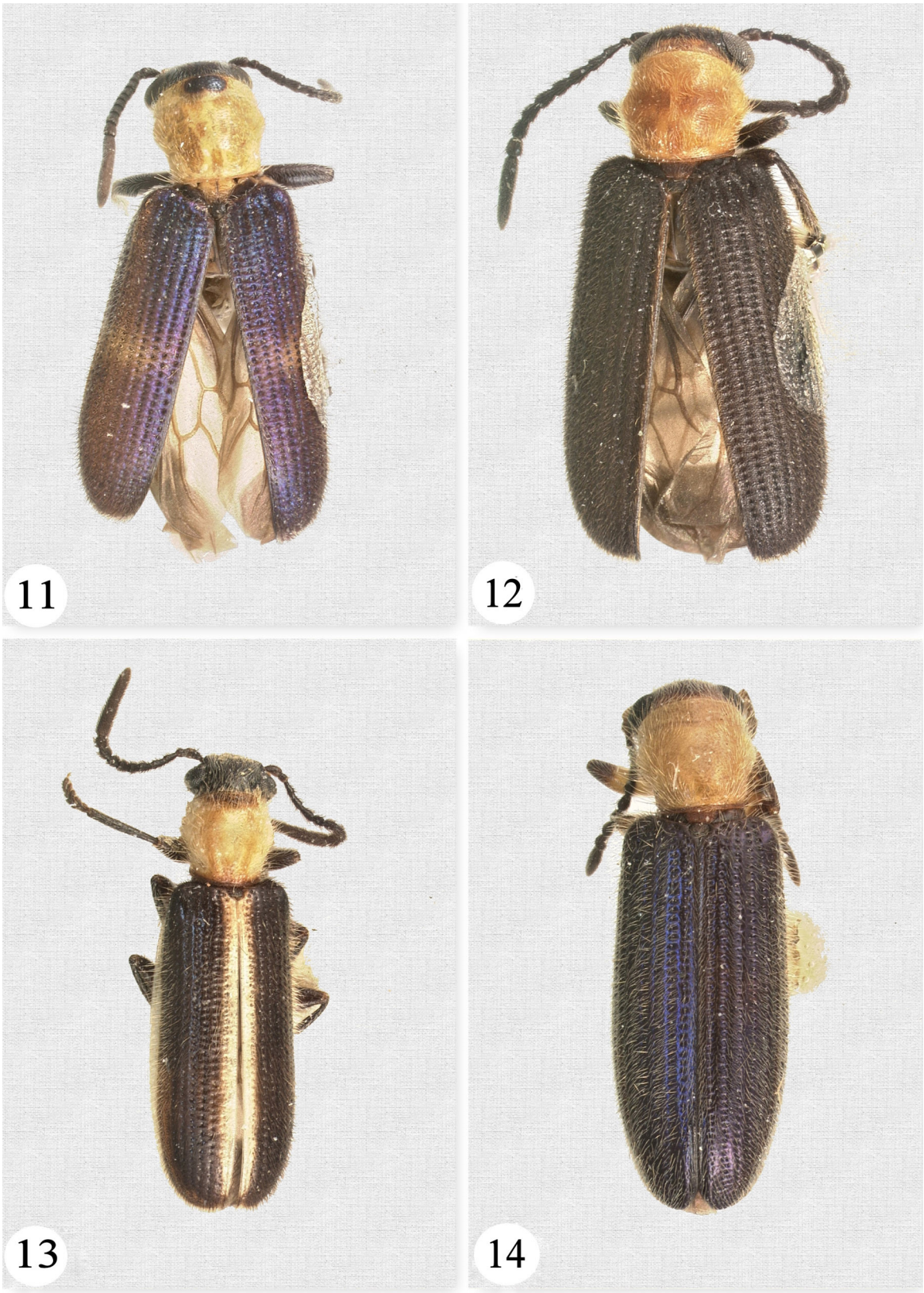
Figures 5–6. Structures of *Onychotillus woodruffi*. **5)** Post-gular process. **6)** Maxillary palpus.



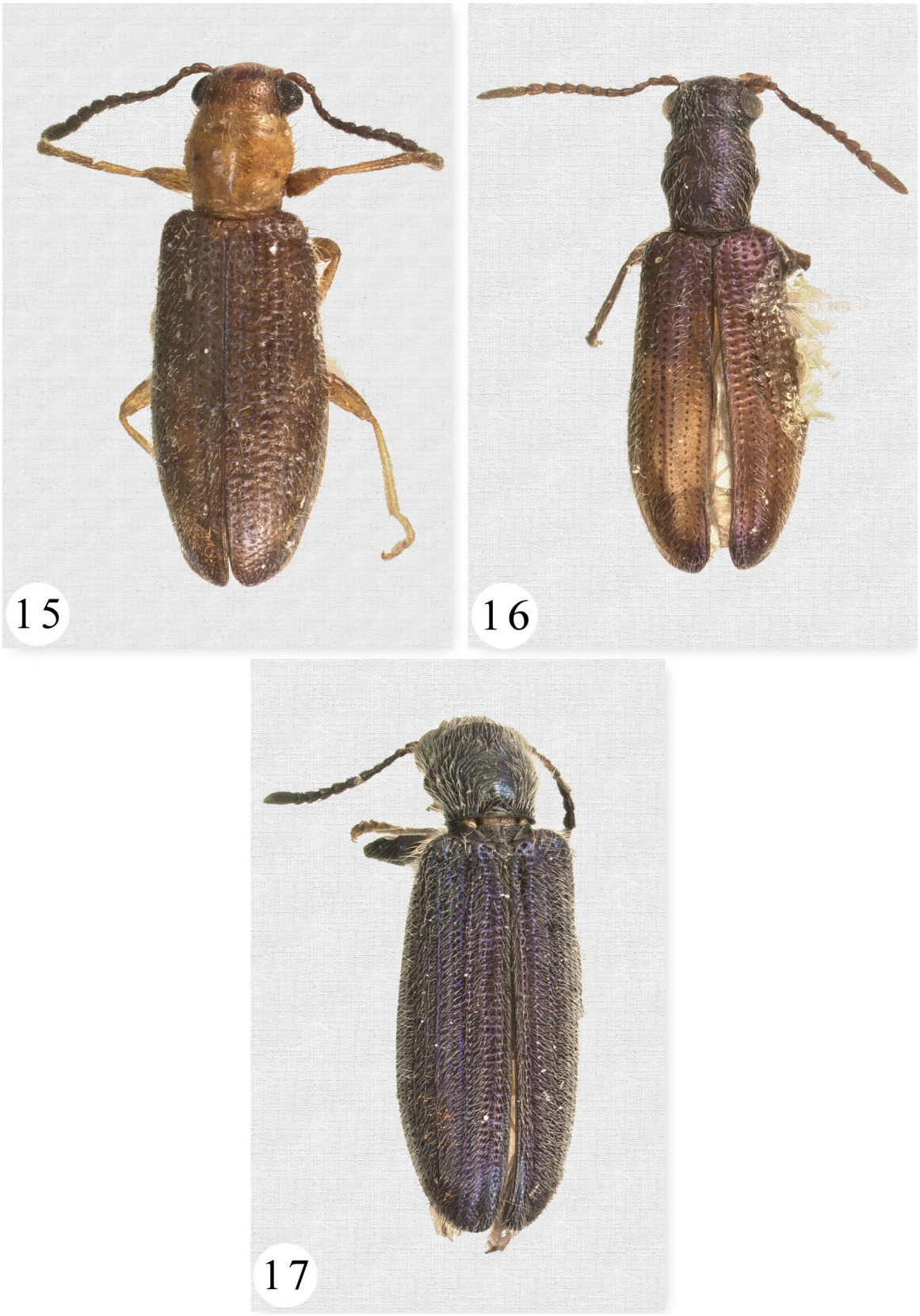
Figures 7–8. Structures of *Onychotillus woodruffi*. **7)** Thorax. **8)** Unguis.



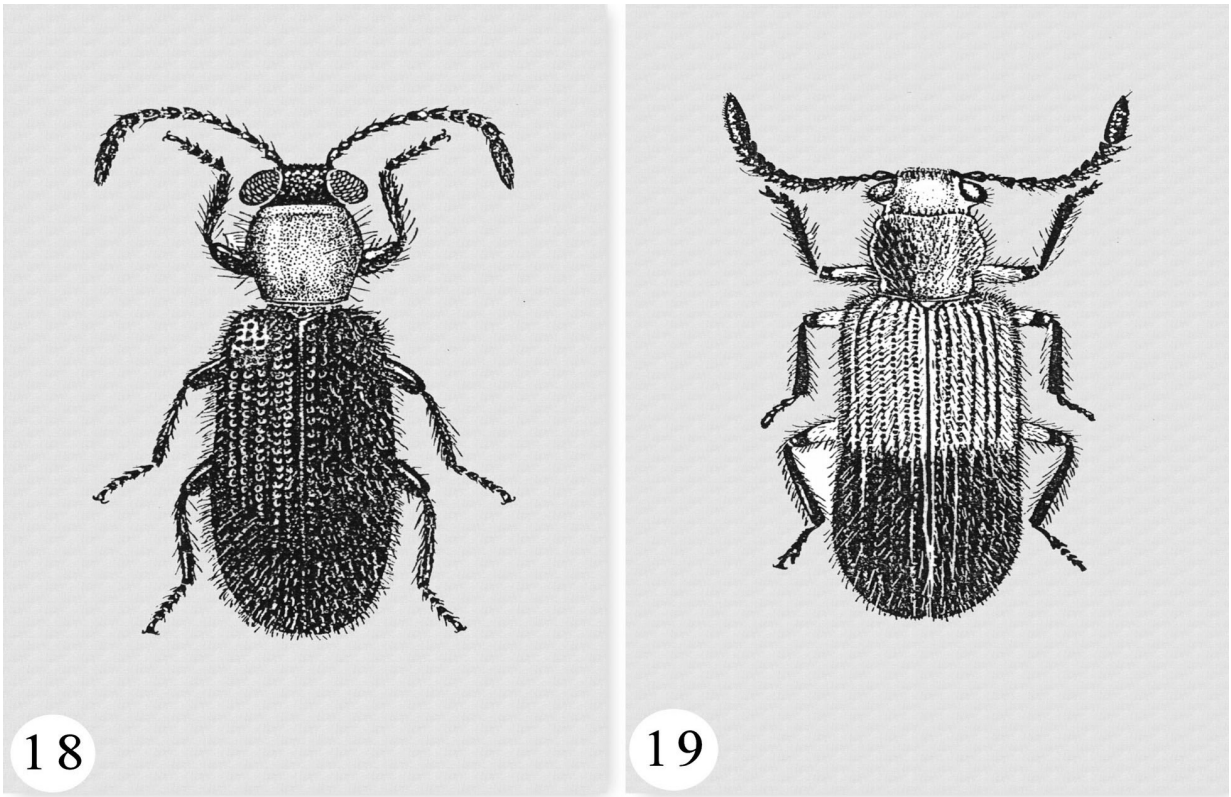
Figures 9–10. Structures of *Onychotillus woodruffi*. **9)** Tarsal spur. **10)** Elytron.

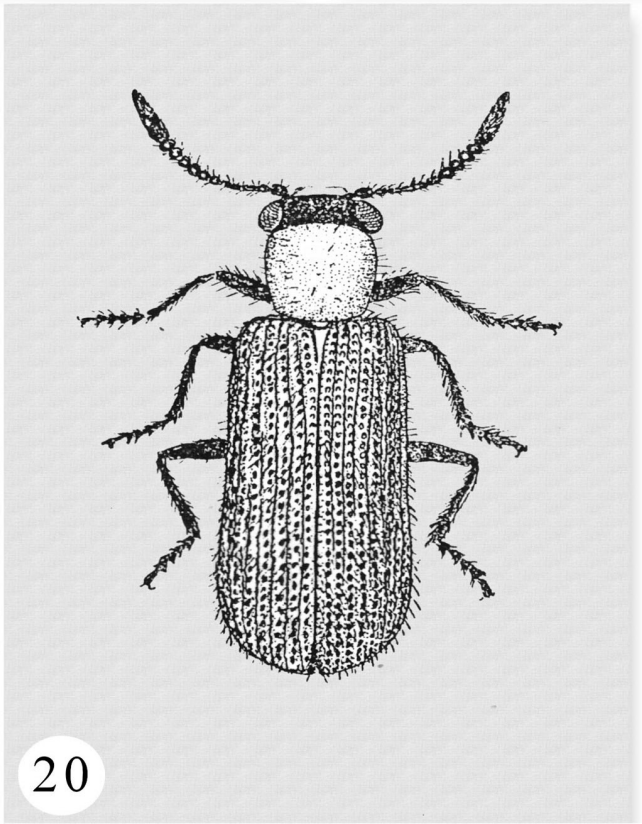


Figures 11–14. Habitus of *Onychotillus* species. **11)** *Onychotillus androwi*. **12)** *O. apiculus*. **13)** *O. cinctipennis*. **14)** *O. lineatus*.

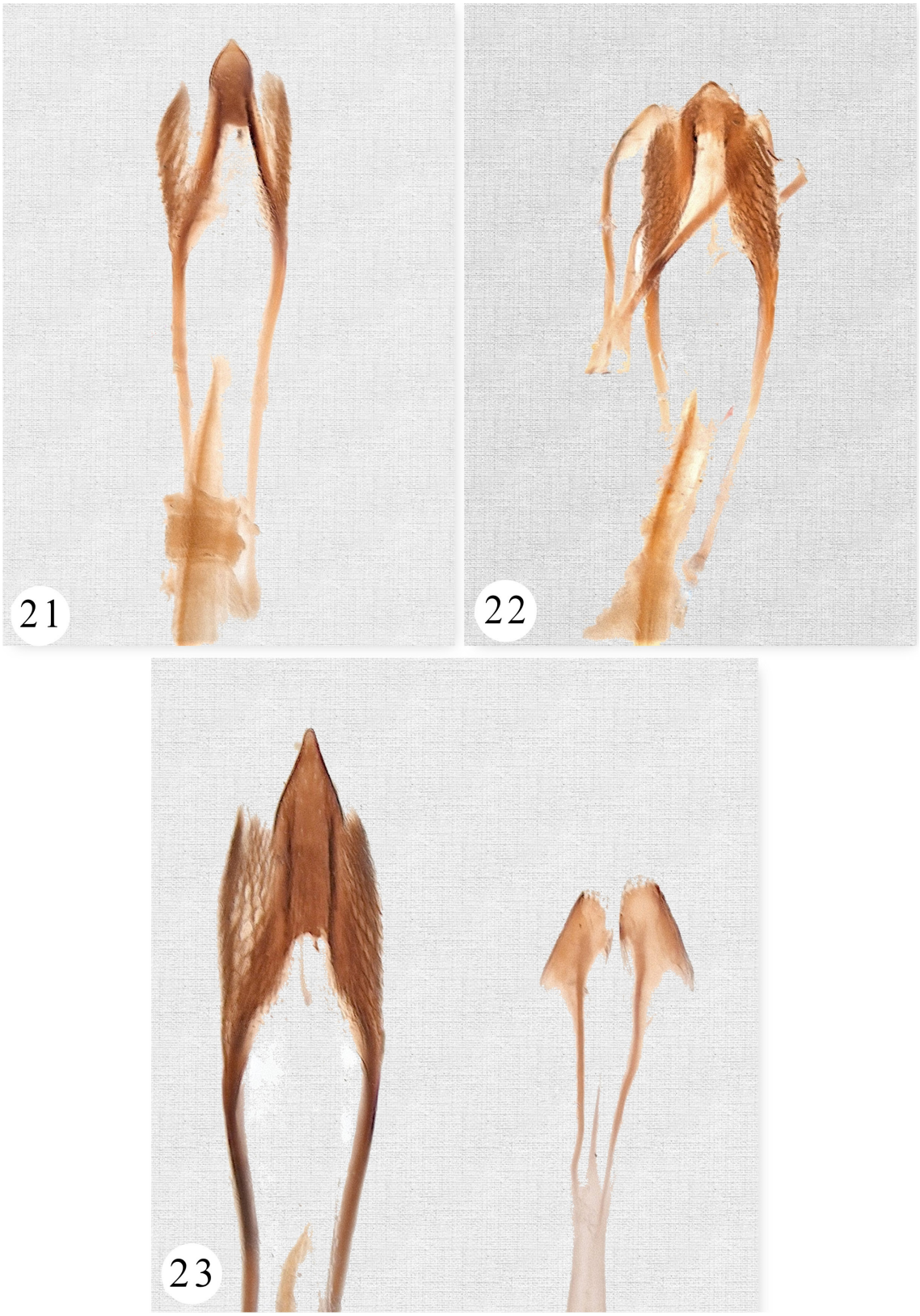


Figures 15–17. Habitus of *Onychotillus* species. **15)** *Onychotillus minutus.* **16)** *O. vittatus.* **17)** *O. woodruffi.*





Figures 18–20. Habitus of *Onychotillus* species. **18)** *Onychotillus cubana.* **19)** *O. dimidiatus.* **20)** *O. trinitatis.* Reproduced from de Zayas (1988).



Figures 21–23. Aedeagus and tegmina. **21)** Tegmen of *Onychotillus androwi.* **22)** Tegmen of *O. cinctipennis.* **23)** Aedeagus of *O. apiculus.*