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Type catalogue of the Australian Anoplognathini MacLeay, 1819 (Coleoptera: Scarabaeidae: Rutelinae) housed in the Natural History Museum, London

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Abstract

The type material of Australian Anoplognathini (Coleoptera: Scarabaeidae: Rutelinae) housed in the Natural History Museum, London, is reviewed, concerning eleven genera: *Amblyterus* MacLeay, 1819, *Anoplognathus* Leach, 1815, *Bilobatus* Machatschke, 1970, *Calloodes* White, 1845, *Eosaulostomus* Carne, 1956, *Epichrysus* White, 1841, *Mesystoechus* Waterhouse, 1878, *Paraschizognathus* Ohaus, 1904, *Saulostomus* Waterhouse, 1878, *Schizognathus* Fischer von Waldheim, 1823, and *Trioplognathus* Ohaus, 1904. In total, type specimens for 32 taxa described between 1841 and 1985 were found in the Natural History Museum, London. The following taxonomic changes are proposed: *Anoplognathus aurora* Arrow, 1919 (stat.n.) = *Anoplognathus pallidus* Arrow, 1919 (syn.n.); *Anoplognathus explanatus* Arrow, 1901 (stat.n.); *Anoplognathus macleayi* Blackburn, 1892 = *Anoplognathus narmarus* Carne, 1957 (syn.n.); *Anoplognathus suturalis* Boisduval, 1835 = *Anoplognathus hirsutus* Burmeister, 1844 (syn.n.). Lectotypes are designated for *Anoplognathus aurora, A. explanatus* Arrow, 1901*, A. hirsutus, A. macleayi*, and *A. pallidus* Arrow, 1919. Photographs of type specimens for all taxa examined are presented for the first time.

Keywords. Australia, history, synonymy, nomenclature, Christmas beetle, *Amblyterus*, *Anoplognathus*, *Anoplostethus*, *Bilobatus*, *Calloodes*, *Eosaulostomus*, *Epichrysus*, *Mesystoechus*, *Paraschizognathus*, *Saulostomus*, *Schizognathus*, *Trioplognathus*, Arrow, Blackburn, Carne, Lea, Ohaus, Waterhouse, White.

Zusammenfassung

Das Typenmaterial der australischen Anoplognathini (Coleoptera: Scarabaeidae: Rutelinae), welche im Natural History Museum, London, verwahrt werden, wird revidiert. Es betrifft elf Gattungen: *Amblyterus* MacLeay, 1819, *Anoplognathus* Leach, 1815, *Bilobatus* Machatschke, 1970, *Calloodes* White, 1845, *Eosaulostomus* Carne, 1956, *Epichrysus* White, 1841, *Mesystoechus* Waterhouse, 1878, *Paraschizognathus* Ohaus, 1904, *Saulostomus* Waterhouse, 1878, *Schizognathus* Fischer von Waldheim, 1823 und *Trioplognathus* Ohaus, 1904. Insgesamt wurden Typusexemplare von 32 Taxa, die zwischen 1841 und 1985 beschrieben wurden, im Natural History Museum, London, gefunden. Die folgenden taxonomischen Änderungen werden durchgeführt: *Anoplognathus aurora* Arrow, 1919 (stat.n.) = *Anoplognathus pallidus* Arrow, 1919 (syn.n.); *Anoplognathus explanatus* Arrow, 1901 (stat.n.); *Anoplognathus macleayi* Blackburn, 1892 = *Anoplognathus narmarus* Carne, 1957 (syn.n.); *Anoplognathus suturalis* Boisduval, 1835 = *Anoplognathus hirsutus* Burmeister, 1844 (syn.n.). Lectotypen werden für *Anoplognathus aurora, A. explanatus* Arrow, 1901*, A. hirsutus, A. macleayi* und *A. pallidus* Arrow, 1919 designiert. Für alle untersuchten Taxa werden erstmals Fotografien präsentiert.

Introduction

This study reviews the type material of Australian Anoplognathini MacLeay, 1819 housed in the Natural History Museum, London (henceforth NHML).

Anoplognathini is a tribe of shining leaf chafers (Rutelinae) that is exclusively distributed in the Southern Hemisphere (Australia and Neotropical region). In Australia only two out of five subtribes are present: Anoplognathina MacLeay, 1819 and Schizognathina Ohaus, 1918. The Australian species of Anoplognathini are endemic to Australia, therefore there is no confusion with species described from elsewhere.

The NHML holds Australian anoplognathine type material of species described by White (1841, 1845), Waterhouse (1868, 1873, 1874, 1878, 1889), Blackburn (1888, 1890, 1892a, b, 1900), Arrow (1901, 1919), Ohaus (1904), Lea (1919), and Carne (1956, 1957, 1958, 1974, 1975, 1981, 1985).

Adam White (1817–1879), Charles Waterhouse (1843–1917) and Gilbert Arrow (1873–1948) were professional entomologists at NHML (Daniels 2004). White notably worked on material in NHML collected by early explorers of remote parts of Australia. Thomas Blackburn (1844–1912) was a clergyman based in South Australia, with a passionate interest in Coleoptera, describing more than 3000 species. His type material was gifted to the NHML, with duplicates deposited in the South Australian Museum, Adelaide (Lea 1912). Thus, all the types of all his species based on singletons should be in NHML. Friedrich Ohaus (1864–1946) specialised in the taxonomy of Rutelinae and was based in Berlin (Nissen 1952). Arthur Lea (1868–1932) was a professional entomologist based at the South Australian Museum for the last 20 years of his life. He described more than 5000 species of Coleoptera. Philipp Carne (1921–1989) was a professional entomologist at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) where he researched the ecology of agricultural and forestry pests and through that revised the Australian Anoplognathini (Daniels 2004). To complete our taxonomic work on this group of species, we include type material of a single species described by Burmeister (1807–1892), lodged in the Martin Luther University museum, Halle, Germany.

Carne provided the only available keys to the genera and species of Anoplognathini (e.g., Carne 1956, 1957, 1958), however he failed to examine early type material held in non-Australian collections, leading to misidentifications which became entrenched in subsequent literature. Some misidentifications of species described by European authors have been noted (Seidel & Reid 2021); here we compare type material in the NHML with Carne's diagnoses.

Methods and materials

Photographs were taken with a Canon DSLR camera, Laowa 60 mm macro lens. All photographs were processed through the focus stacking software Helicon Focus and were later edited using GIMP. The beginning and end of label text are indicated using double quotes (“”); a double slash (//) separates the data on different labels; a single vertical bar (|) indicates that the label is written double sided; braces ({ }) indicate the colour of label without any written information; square brackets ([]) contain explanations. Newly added labels are not depicted in the figures.

For senior synonyms with types present in NHML we apply the currently valid combination in the catalogue. Where only types of junior synonyms were found, the original combination is used.

Acronyms of collections

AMS Australian Museum, Sydney, Australia.

ANIC Australian National Insect Collection, Canberra, Australia.

NHML Natural History Museum, London, United Kingdom.

MLUH Zentralmagazin Naturwissenschaftlicher Sammlungen, Martin-Luther-Universität, Halle (Saale), Germany.

All specimens are deposited in NHML unless otherwise stated.

Taxonomy

Genus *Amblyterus* MacLeay, 1819

Amblyterus paradoxus Carne, 1975 (Fig. 1)

Amblyterus paradoxus Carne, 1975: 43.

Types. 1 ♂, paratype: "Para-type // Guyra.N.S.W . 26 Dec. 1967 . J. Frazier . // B.M. 1974-588 // Amblyterus paradoxus sp. nov P.B.Carne PARATYPE // NHMUK014380383".

Remarks. Currently recognized as a valid species.

Genus *Anoplognathus* Leach, 1815

Anoplognathus aeneus Waterhouse, 1868 (Fig. 2)

Anoplognathus aeneus Waterhouse, 1868: 8.

Type material examined. 1 ♀, holotype: "Type // N.E. Australia | 68. 23. // æneus Waterh. Type. Ent. Month. Mag. May 1868. // HOLOTYPE ♀ Anoplognathus aeneus Waterhouse, 1868 det. Seidel 2023 // NHMUK014192245".

Remarks. Currently recognized as a valid species. In the original description Waterhouse (1968: 9) indicates only a single specimen ("This insect, which […] I believe to be a female"), which we therefore consider to be the holotype.

Anoplognathus aureus Waterhouse, 1889 (Figs 3–5)

Anoplognathus aureus Waterhouse, 1889: 360 (Fig. 3).

Calloodes frenchi Blackburn, 1890: 148 (subjective synonymy by Carne 1957: 127) (Fig. 4).

Anoplognathus concinnus Blackburn, 1900: 40 (subjective synonymy by Arrow 1919: 379) (Fig. 5).

Type material examined. *Anoplognathus aureus*: 1 ♂, syntype: "Austr. 89-22 // Type // Anoplognathus aureus, (Type) Waterh. // SYNTYPE ♂ Anoplognathus aureus Waterhouse, 1889 det. Seidel 2023 // NHMUK014192246".

Calloodes frenchi: 1 ♀, syntype: "Type H.T. // Blackburn coll. 190–236. // 3314 // Calloodes Frenchi, Blackb. // SYNTYPE ♀ Calloodes frenchi Blackburn, 1890 det. Seidel 2023 // NHMUK014380409".

Anoplognathus concinnus: 1 ♂, syntype: "Type H.T. // 6640 N.Qu. T. // Blackburn coll. 1910–236. // Anoplognathus concinnus, Blackb. // SYNTYPE ♂ Anoplognathus concinnus Blackburn, 1900 det. Seidel 2023 // NHMUK014380411".

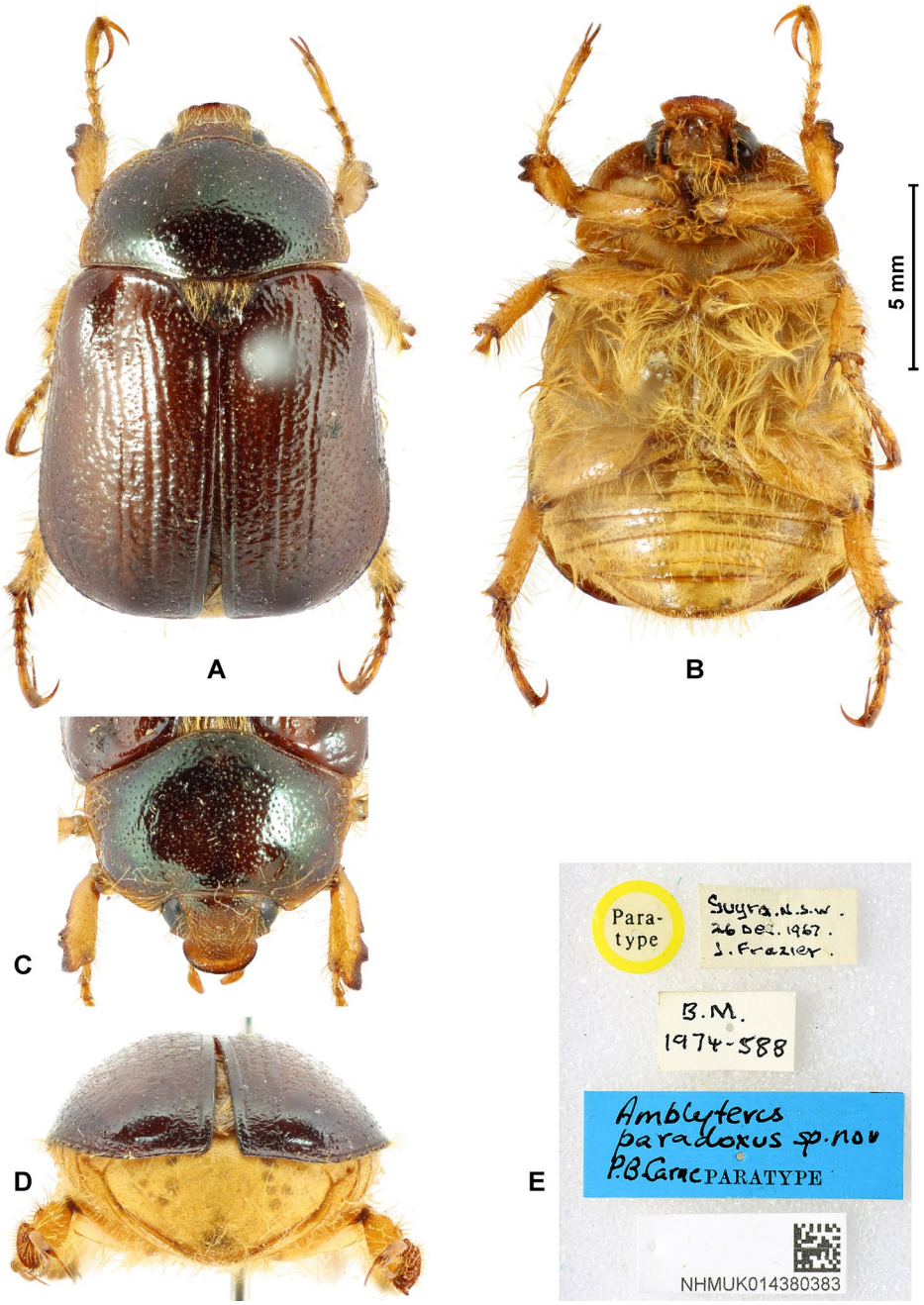

Fig. 1. *Amblyterus paradoxus*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

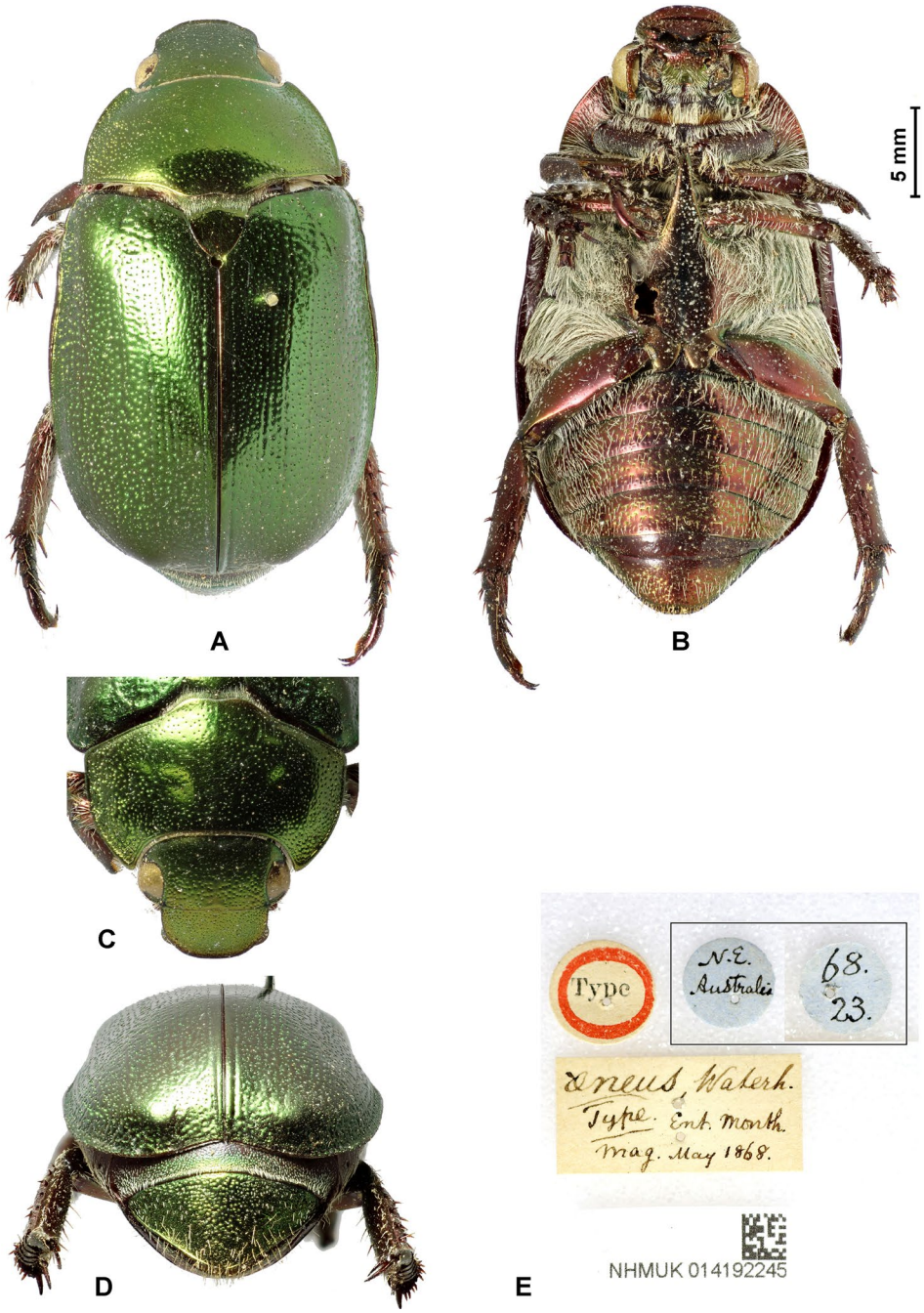

Fig. 2. *Anoplognathus aeneus*, holotype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

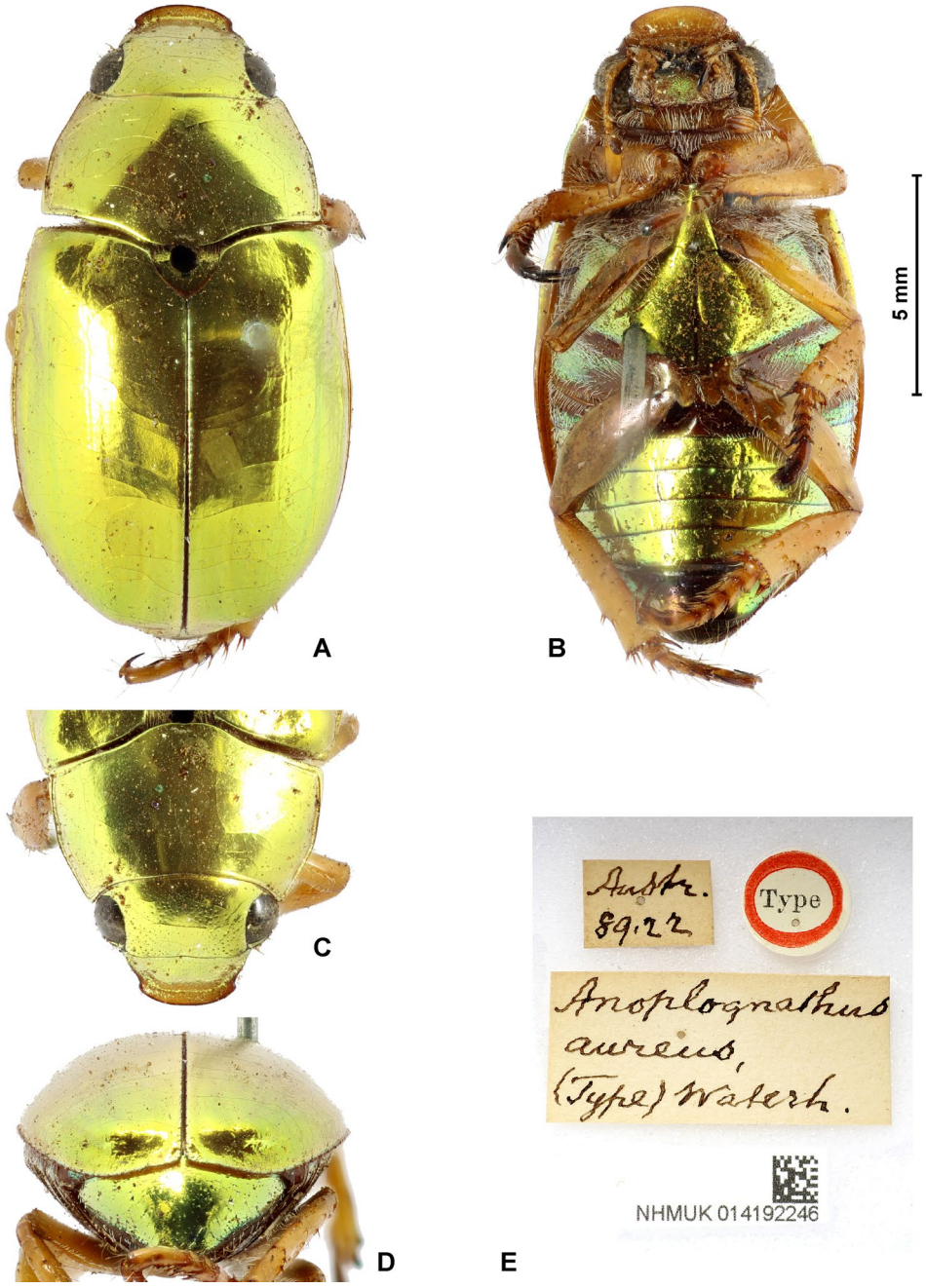

Fig. 3. *Anoplognathus aureus*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

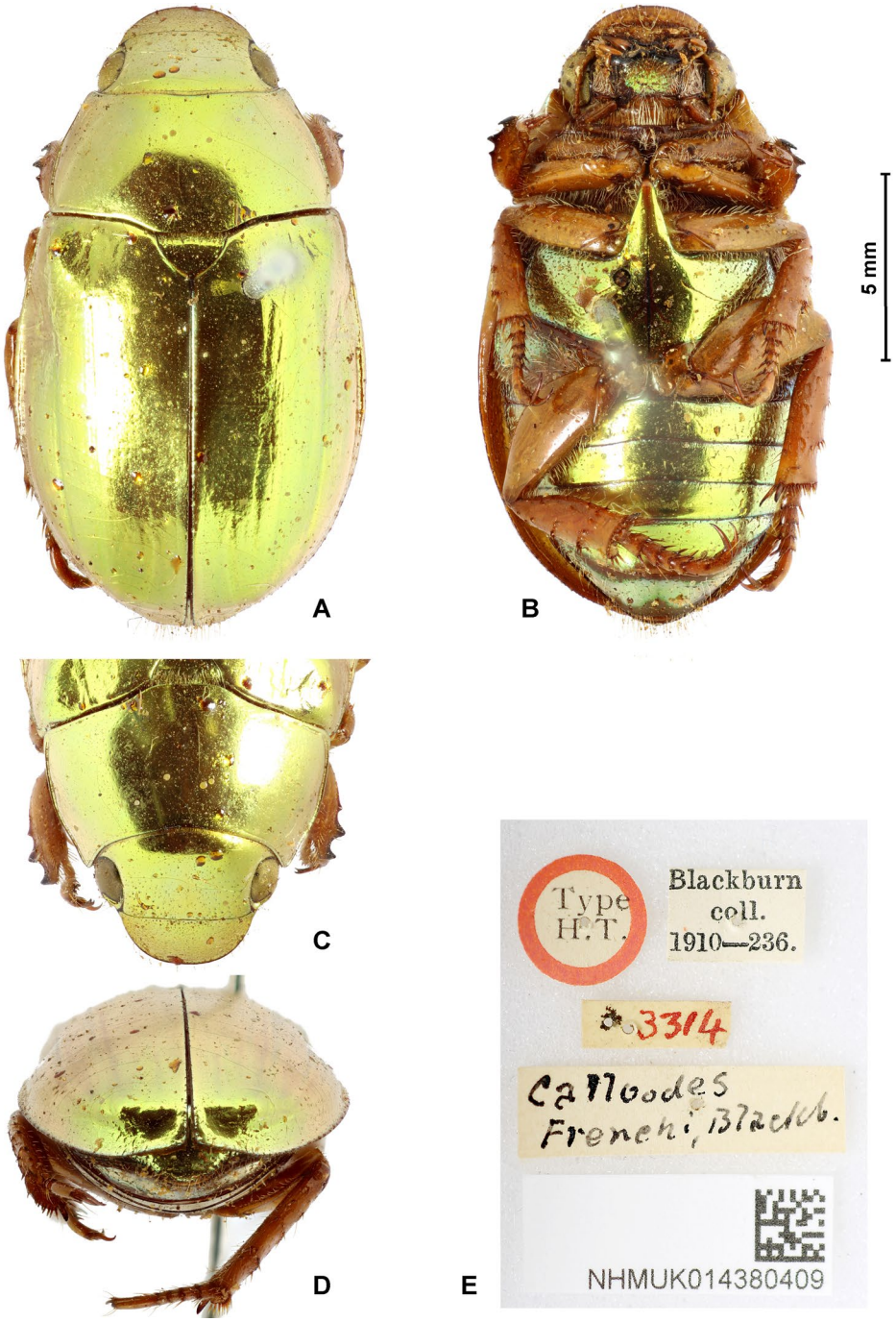

Fig. 4. *Calloodes frenchi* [junior synonym of *Anoplognathus aureus*], syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

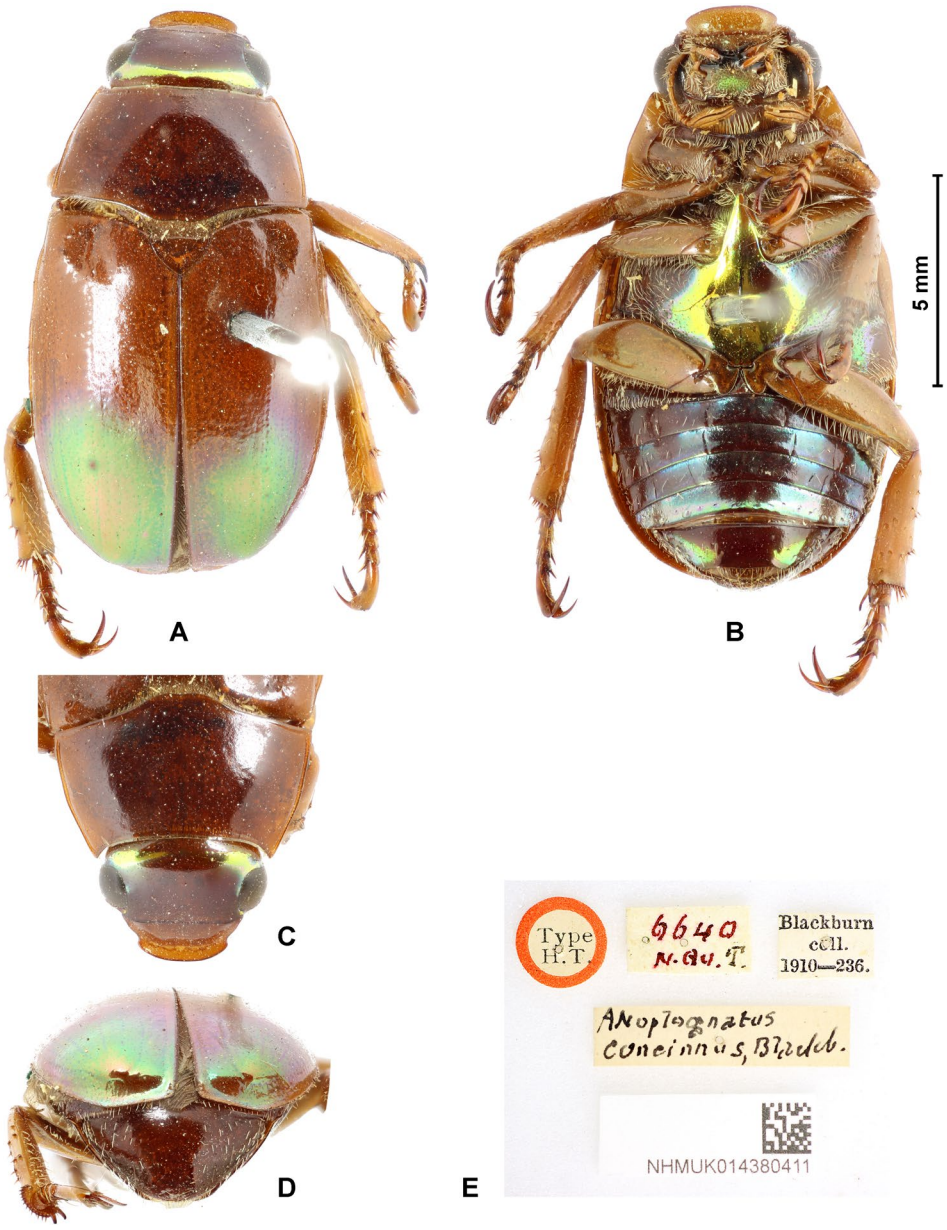

Fig. 5. *Anoplognathus concinnus* [junior synonym of *Anoplognathus aureus*], syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

Remarks. *Anoplognathus aureus* is currently recognized as a valid species with two junior subjective synonyms, *Calloodes frenchi* and *Anoplognathus concinnus*. Based on the examination of the types presented here, we can confirm these synonymies. Two almost identically labelled female "cotypes" of *Calloodes frenchi* ("Co-type // CO-TYPE // Nov Holl Austr. // Fry Coll. 1905-100. // Frenchi Sloane S. Australia co-Types // NHMUK014380412" and "{Red circular label} // 68193 // Co-type // CO-TYPE // Nov Holl Austr. // Fry Coll. 1905-100. // 3 // NHMUK014380413") can be excluded as syntypes, since the type locality is North Queensland and not South Australia. Waterhouse (1889) and Blackburn (1890, 1900) did not designate holotypes or indicate the number of specimens. We therefore consider all of them to be syntypes.

Anoplognathus aurora Arrow, 1919 (Figs 6–7)

Anoplognathus aurora Arrow, 1919: 381, stat.rev. (Fig. 6).

Anoplognathus macleayi aurora Arrow, 1919 (subspecific status by Carne 1957: 108).

Anoplognathus pallidus Arrow, 1919: 380, syn.n. (Fig. 7).

Anoplognathus macleayi sensu Carne, nec Blackburn, 1892.

Type material examined. *Anoplognathus aurora*: 1 ♂, lectotype (here designated): "Type H.T. // W.Australia. Tambrey. W.H.Cusack. 1904–58. // LECTOTYPE ♂ Anoplognathus aurora Arrow, 1919 des. Seidel 2023 // NHMUK014192227"; 1 ♂, paralectotype: "Para-type // N.W.Australia. Tambrey. W.H.Cusack. 1904–58. // Paratype Anoplognathus aurora Arrow E.B.Britton det., 1955 // Anoplognathus macleayi aurora Arrw. // PARALECTOTYPE ♂ Anoplognathus aurora Arrow, 1919 des. Seidel 2023 // NHMUK014192228"; 1 ♂, paralectotype: "Tambrey, N.W.Austr. W.H.Cusack. 1904-188. // PARALECTOTYPE ♂ Anoplognathus aurora Arrow, 1919 des. Seidel 2023 // NHMUK014192229".

Anoplognathus pallidus: 1 ♂, lectotype (here designated): "Type H.T. // ♂ // Hermannsburg, Central Australia. H.J.Hillier. 1911–311. // ANOPLOGNATHUS PALLIDUS ARROW "TYPE" Det:A.B.T.Smith 2001 // LECTOTYPE ♂ Anoplognathus pallidus Arrow, 1919 des. Seidel 2023 // NHMUK014190627"; 4 ♀♀, including 3 paralectotypes: "Hermansburg. N.T., S.Australia. H.J.Hillier. 1907-233. // PARALECTOTYPE? ♀ Anoplognathus pallidus Arrow, 1919 des. Seidel 2023 // NHMUK014190628"; "Hermannsburg, Central Australia. H.J.Hillier. 1910-158. // Anoplognathus pallidus Arrow prob. paratype E.B.Britton det., 1951 // PARALECTOTYPE? ♀ Anoplognathus pallidus Arrow, 1919 des. Seidel 2023 // NHMUK014190629"; "♀ // Hermannsburg, Central Australia. H.J.Hillier. 1908–177. // 24. 25-[?]-08 // PARALECTOTYPE? ♀ Anoplognathus pallidus Arrow, 1919 des. Seidel 2023 // NHMUK014190630"; "6 . 1 . 08 Central Australia. Hermansburg, Charlotte Waters. H.J.Hillier. 1908–133. // 24 // PARALECTOTYPE? ♀ Anoplognathus pallidus Arrow, 1919 des. Seidel 2023 // NHMUK014190631".

Remarks. Carne (1957) recognized *A. aurora* as valid subspecies and *A. pallidus* as a subjective junior synonym of *A. macleayi* Blackburn, 1892b but only examined syntypes of *A. aurora* and *A. pallidus*, not *A. macleayi*. However, he had misidentified *A. macleayi*, which is a southern Australian species (see below). Here we recognise *A. aurora* as a valid species, which is a senior subjective synonym of *A. pallidus*. Since there appear to be no significant morphological differences between *A. aurora* and *A pallidus* this synonymization is justified and we refrain from applying Carne's (1957) subspecies concept.

Arrow (1919) did not designate a holotype for *A. aurora* but stated that he had three male specimens, which we therefore consider to be syntypes. Furthermore, he did not designate a holotype for *A. pallidus* but stated that he had one male and three females, which we also consider to be syntypes. We recovered four possible female syntypes, and we are unable to distinguish which specimen does not belong to the type series. To fix the identities of these confused names we hereby designate lectotypes for each.

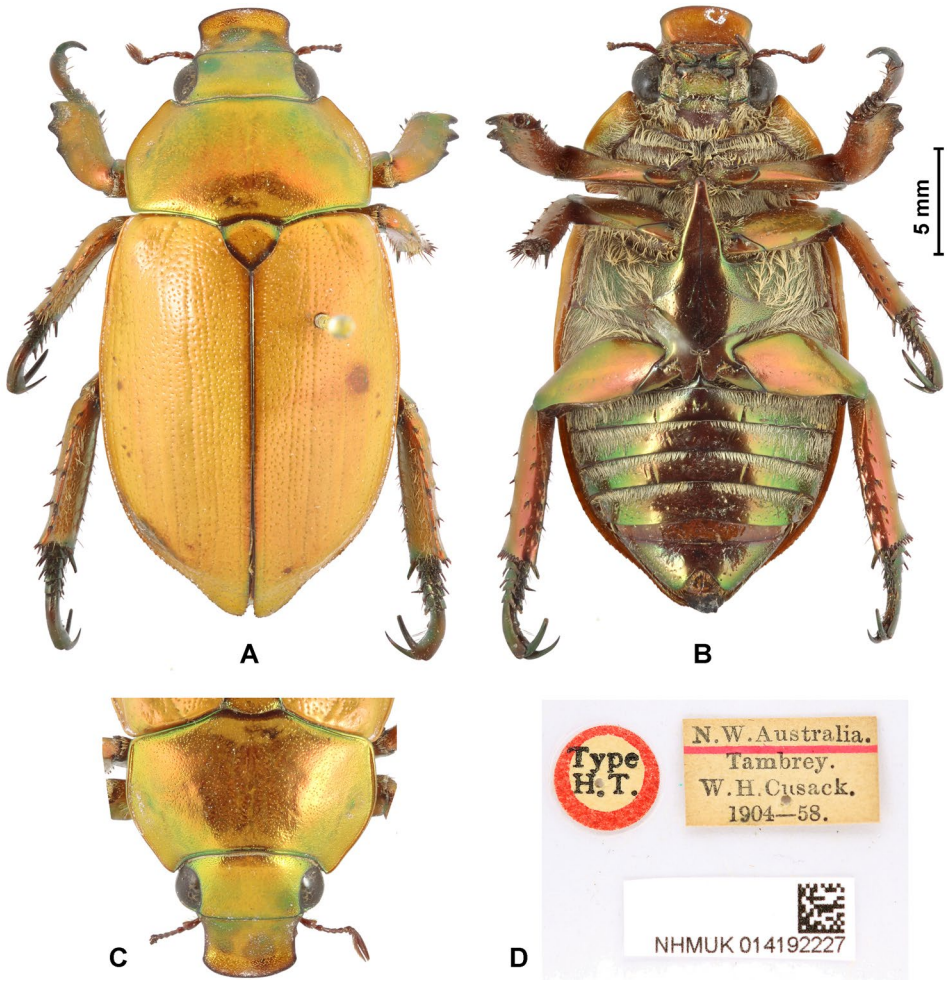

Fig. 6. *Anoplognathus aurora*, lectotype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

Anoplognathus blackdownensis Carne, 1981 (Fig. 8)

Anoplognathus blackdownensis Carne, 1981: 289.

Type material examined. 1♂, paratype: "Queensland MONTO. 10 JAN.1975 ~~19~~ m.s.moulds // ex collection A.Walford-Huggins // PARA-TYPE // Anoplognathus blackdownensis Carne PARATYPE // E. Gowing-Scopes Collection BMNH(E) 2005-4 // NHMUK014380398"; 1♀, paratype: "Queensland MONTO 10 JAN. 1975 . . m.s.moulds // ex collection A.Walford-Huggins // PARA-TYPE // Anoplognathus blackdownensis Carne PARATYPE // E. Gowing-Scopes Collection BMNH(E) 2005-4 // NHMUK014380399".

Remarks. Currently recognized as a valid species.

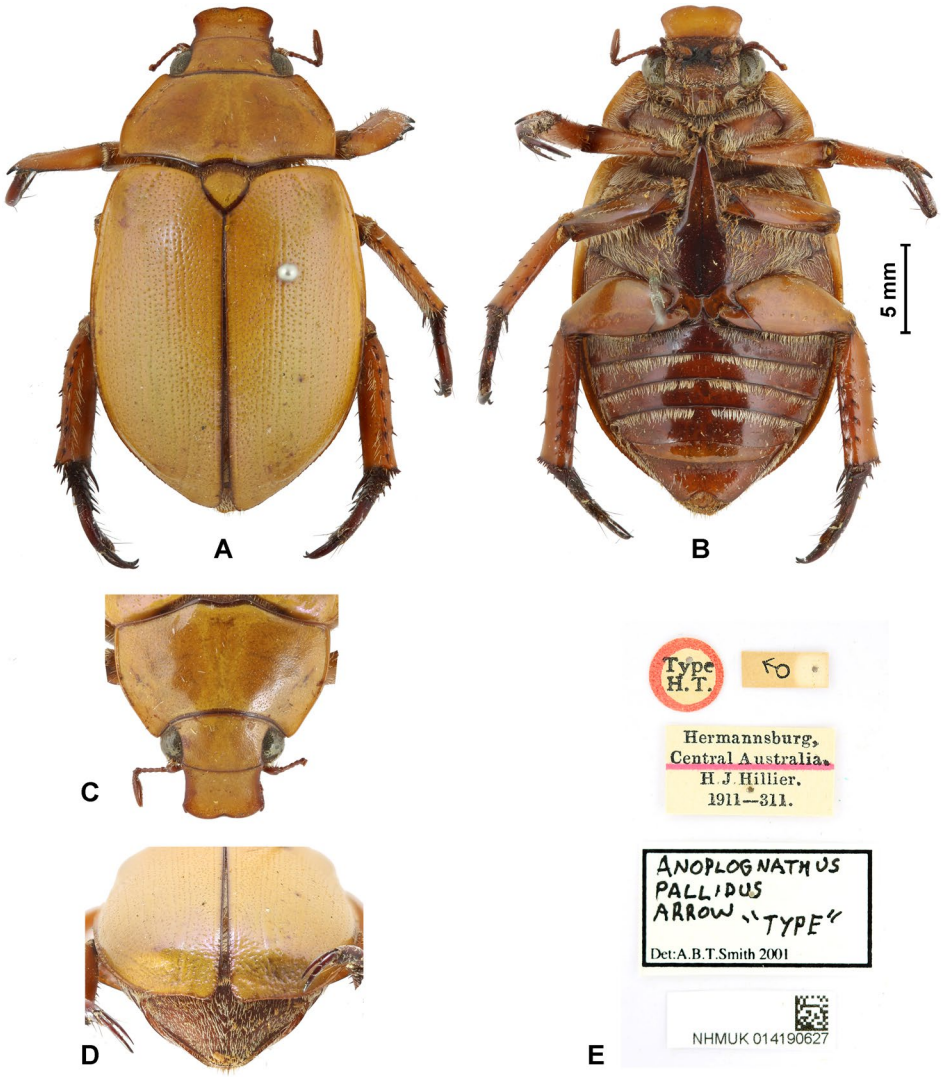

Fig. 7. *Anoplognathus pallidus* [junior synonym of *Anoplognathus aurora*], lectotype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

Anoplognathus brevicollis Blackburn, 1892 (Fig. 9)

Anoplognathus brevicollis Blackburn, 1892b: 493.

Type material examined. 1♂, syntype: "Type H.T. // N.T. [= Northern Territory] // Blackburn coll. 1910–236. // Anoplognathus brevicollis, Blackb // SYNTYPE ♂ Anoplognathus brevicollis Blackburn, 1892 det. Seidel 2023 // NHMUK014190634".

Remarks. Currently recognized as a valid species. Blackburn (1892b) had multiple specimens and did not designate a holotype. We therefore consider this specimen to be a syntype.

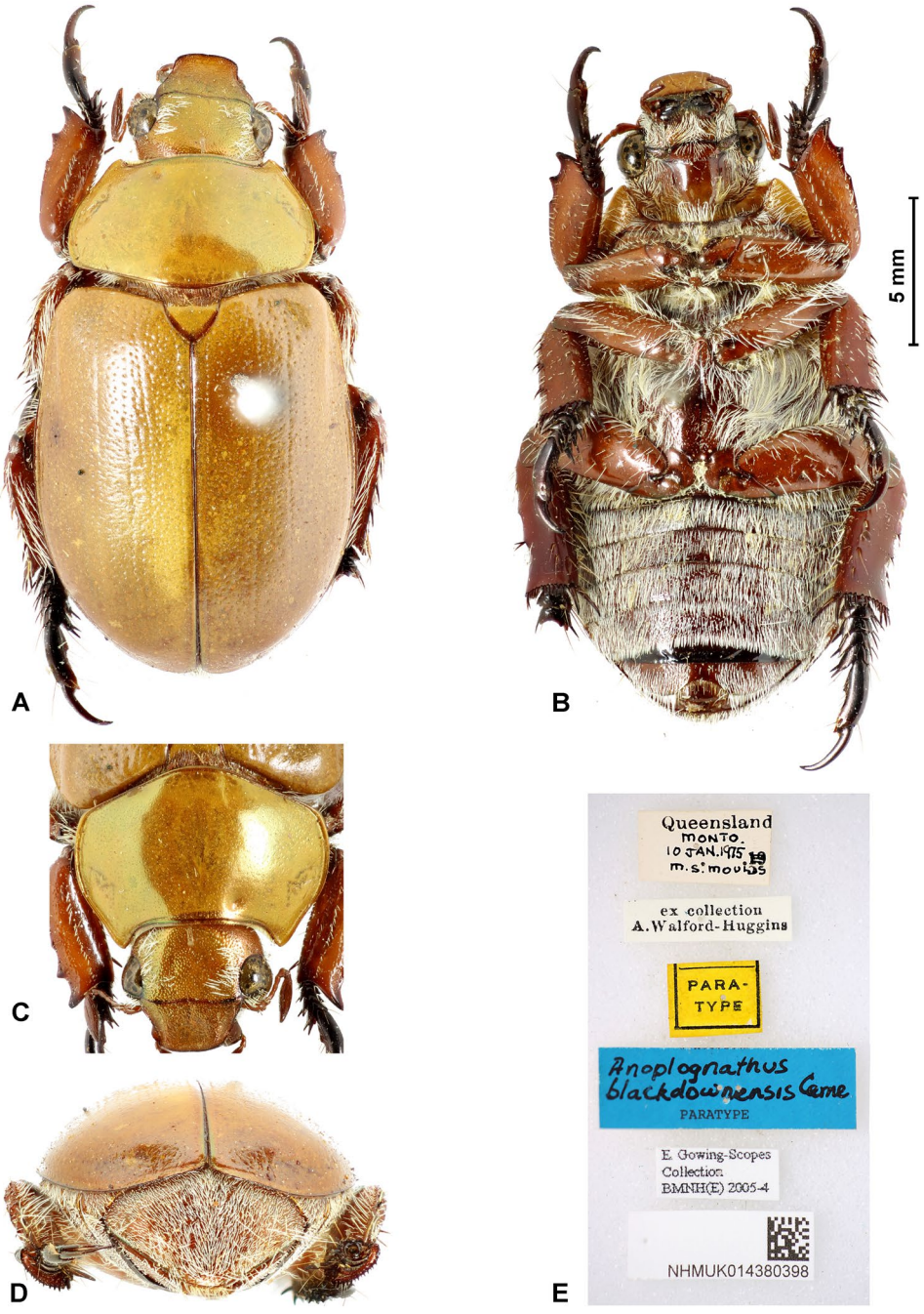

Fig. 8. *Anoplognathus blackdownensis*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

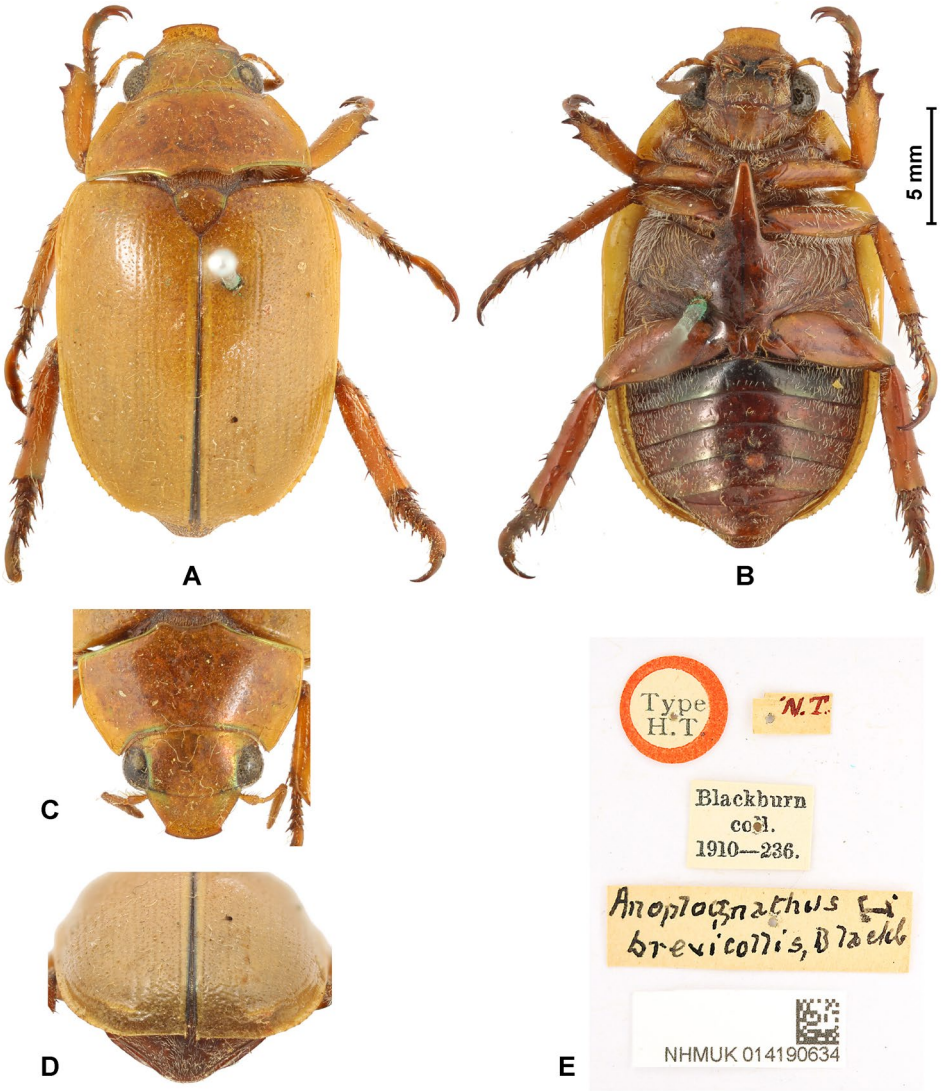

Fig. 9. *Anoplognathus brevicollis*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

***Anoplognathus explanatus* Arrow, 1901** (Fig. 10)

Anoplognathus explanatus Arrow, 1901: 397, stat.rev.

Anoplognathus hirsutus sensu Carne 1957, nec sensu Burmeister 1844.

Type material examined. 1♂, lectotype (here designated): "Type // New S.Wales. 1901-164. // Anoplognathus explanatus, Arrow type ♂ // LECTOTYPE ♂ Anoplognathus explanatus Arrow, 1901 des. Seidel 2023 // NHMUK014190625"; 1♀, paralectotype: "Type // New S.Wales. 1901-164. // anoplognathus explanatus, arrow type ♀ // PARALECTOTYPE ♀ Anoplognathus

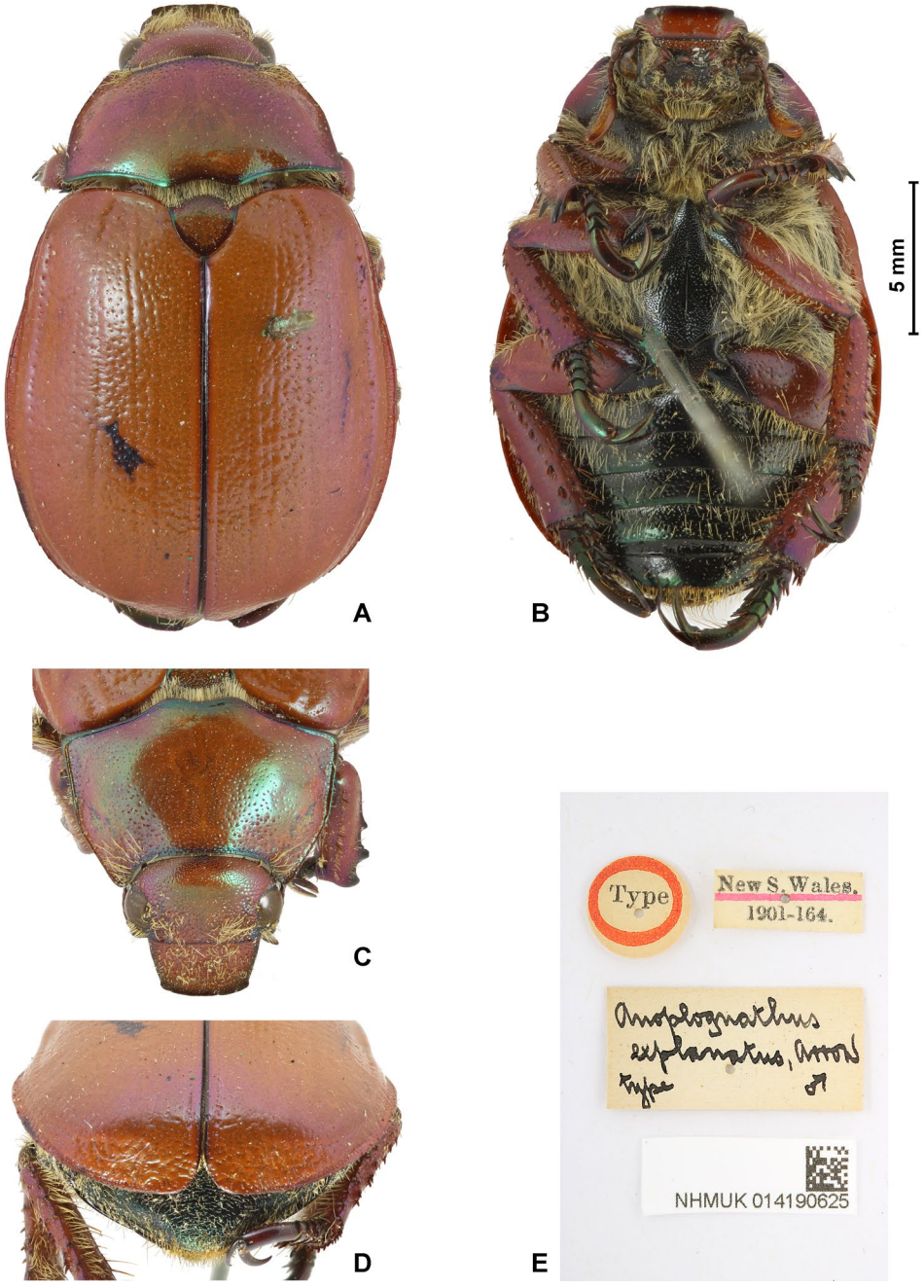

Fig. 10. *Anoplognathus explanatus*, lectotype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

explanatus Arrow, 1901 des. Seidel 2023 // NHMUK014190626"; 1 ♂, paralectotype: "New S.Wales. 1901-164. // PARALECTOTYPE ♂ Anoplognathus explanatus Arrow, 1901 des. Seidel 2023 // NHMUK014190635"; 1 ♀, paralectotype: "New S.Wales. 1901-164. // Anoplognathus explanatus, Arrow // PARALECTOTYPE ♀ Anoplognathus explanatus Arrow, 1901 des. Seidel 2023 // NHMUK014190636".

Remarks. Carne's (1957) misinterpretation of the identity of *A. hirsutus* lead him to synonymise *A. explanatus* under it. Here, we resurrect *A. explanatus* as the correct name to be applied to this species. Arrow (1901) did not designate a holotype or indicate the number of specimens and we therefore consider all of his specimens to be syntypes. To fix the identity of this hitherto confused species we designate a lectotype.

Anoplognathus luridus Arrow, 1901 (Fig. 11)

Anoplognathus luridus Arrow, 1901: 396.

Rutela porosa Dalman in Schönherr, 1817: 63 (subjective synonymy by Carne 1957: 115).

Type material examined. 1 ♂, syntype: "Type // New S.Wales. 1901-164. // Anoplognathus luridus, Arrow type ♂ // SYNTYPE ♂ Anoplognathus luridus Arrow, 1901 des. Seidel 2023 // NHMUK014380379"; 1 ♀, syntype: "New S.Wales. 1901-164. // Anoplognathus luridus, arrow // Anoplognathus porosus Dalm. P.B.Carne det. 1955 // SYNTYPE ♀ Anoplognathus luridus Arrow, 1901 des. Seidel 2023 // NHMUK014380380".

Remarks. Currently recognized as a junior subjective synonym of *Anoplognathus porosus*, a synonymy we confirm here (lectotype of *A. porosus* illustrated in Seidel & Reid (2021)). Arrow (1901) did not designate a holotype or indicate the number of specimens. We therefore consider these specimens to be syntypes.

Anoplognathus macleayi Blackburn, 1892 (Fig. 12)

Anoplognathus macleayi Blackburn, 1892b: 495.

Anoplognathus narmarus Carne, 1957: 110, syn.n.

Type material examined. 1 ♀, holotype: "Type H.T. // Type // Belt. // 3825 // Blackburn coll. 1910–236. // Anoplognathus Macleayi, Blackb. // HOLOTYPE ♀ Anoplognathus macleayi Blackburn, 1892 det. Seidel 2023 // NHMUK014190632".

Remarks. Currently recognized as a valid species, although misinterpreted by Carne (1957). *Anoplognathus macleayi* Blackburn, 1892 is conspecific with the species Carne described as *A. narmarus* Carne, 1957 (holotype male examined in ANIC, female paratype examined in AMS), which becomes a junior subjective synonym. *Anoplognathus macleayi* sensu Carne (1957) corresponds to *A. aurora* Arrow, 1919. Blackburn (1892b) stated "I am doubtful of the sex of my type of this species" which indicates that the specimen is a holotype.

Anoplognathus parvulus Waterhouse, 1873 (Fig. 13)

Anoplognathus parvulus Waterhouse, 1873: 75.

Type material examined. 1 ♂, syntype: "{Pink label} // E. Austra-.lia. | 73. 23. // Type // Anoplognathus parvulus ♂. C.Waterh. Type. Ent. Mag. 1873. // SYNTYPE ♂ Anoplognathus parvulus Waterhouse, 1873 det. Seidel 2023 // NHMUK014380378".

Remarks. Currently recognized as a valid species. Waterhouse (1873) did not designate a holotype or indicate the number of specimens. We therefore consider this specimen to be a syntype.

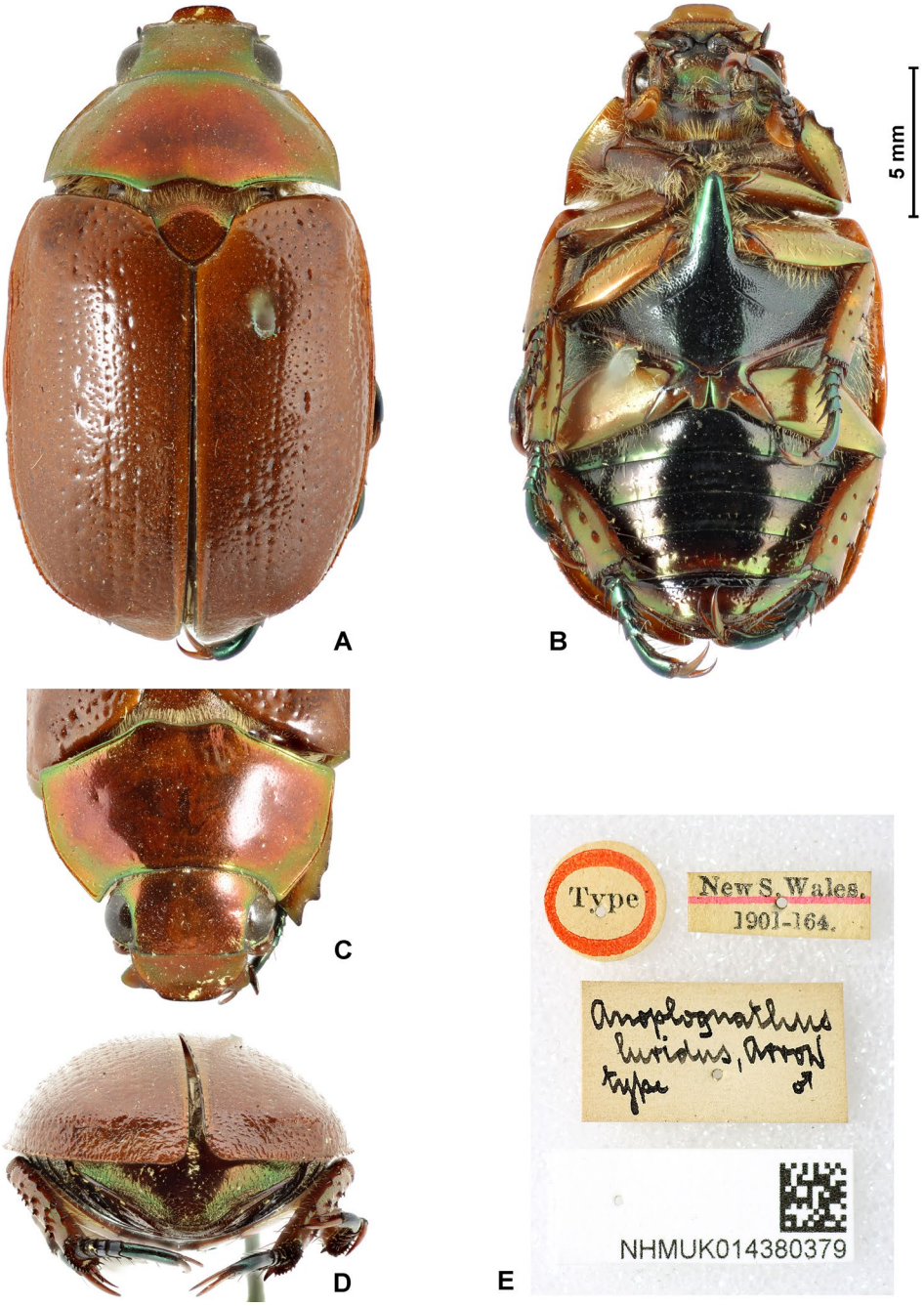

Fig. 11. *Anoplognathus luridus* [junior synonym of *Anoplognathus porosus*], syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

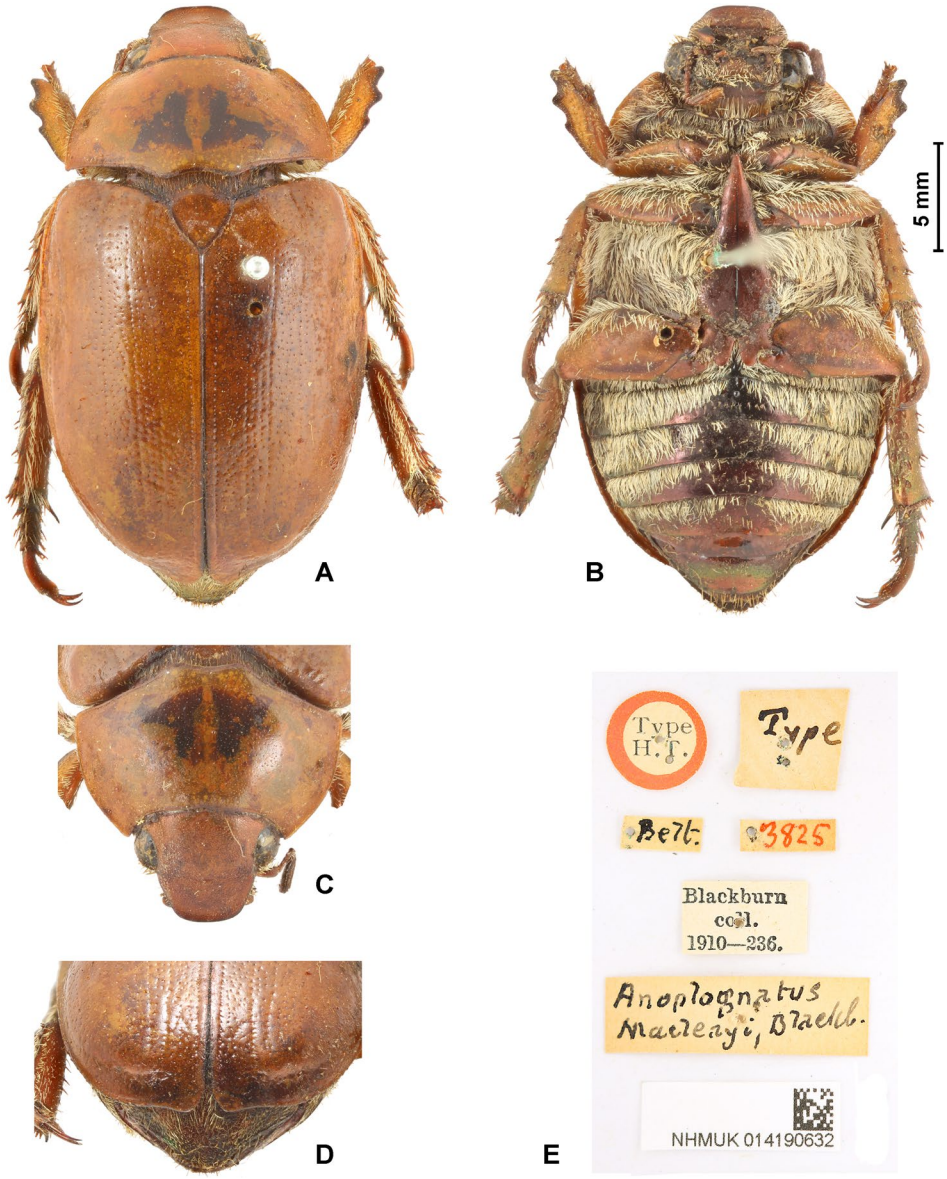

Fig. 12. *Anoplognathus macleayi*, holotype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

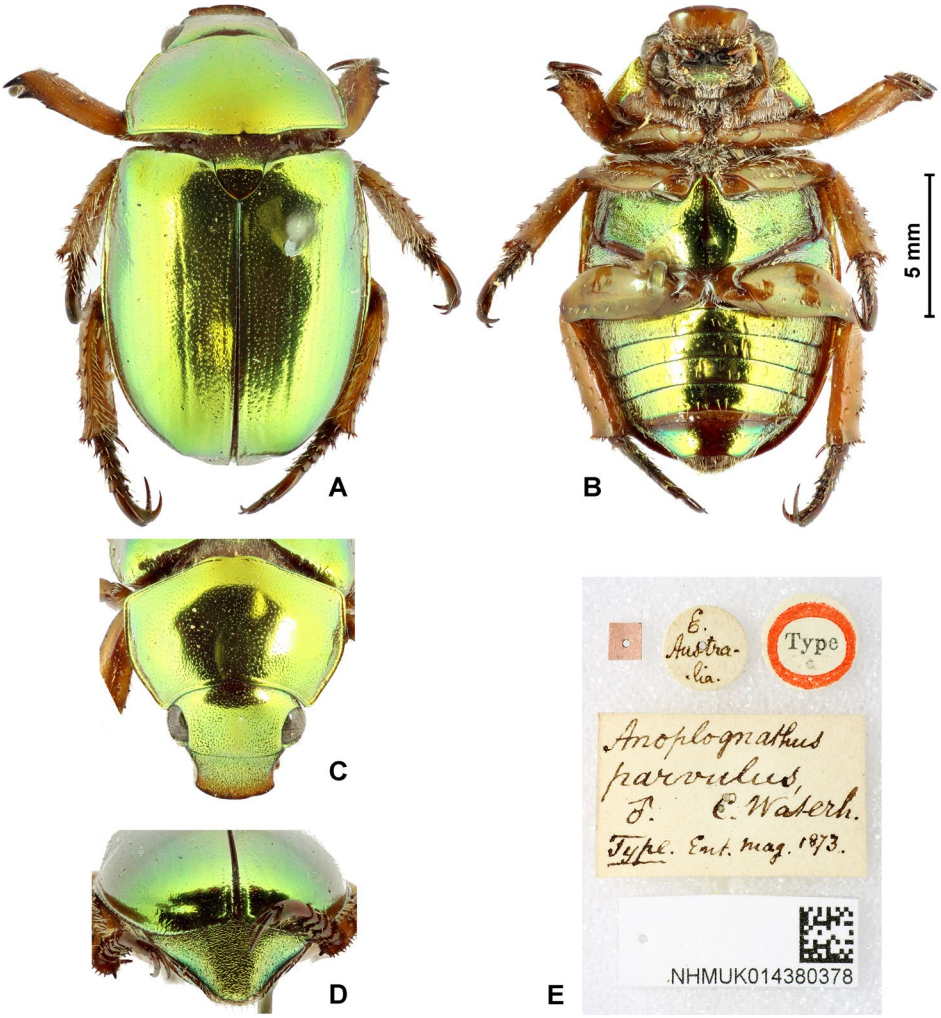

Fig. 13. *Anoplognathus parvulus*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

Anoplognathus pindarus Carne, 1957 (Fig. 14)

Anoplognathus pindarus Carne, 1957: 118.

Invalid type material examined. 1 ♂: "Bathurst // Australia. Coll.Ferguson. 1916–151. // Para-type // A. pindarus, sp.nov. P.B. Carne det., 1956 // NHMUK014380381"; 1 ♀: "Bathurst // Australia. Coll.Ferguson. 1916–151. // Para-type // A. pindarus, sp.nov. P.B. Carne det., 1956 // NHMUK014380382".

Remarks. Currently recognized as a valid species. Carne (1957) stated that over 300 paratypes had been distributed to different museums, including to the NHML, but the locality Bathurst does not appear in his paper. Therefore, these specimens in NHML are not paratypes.

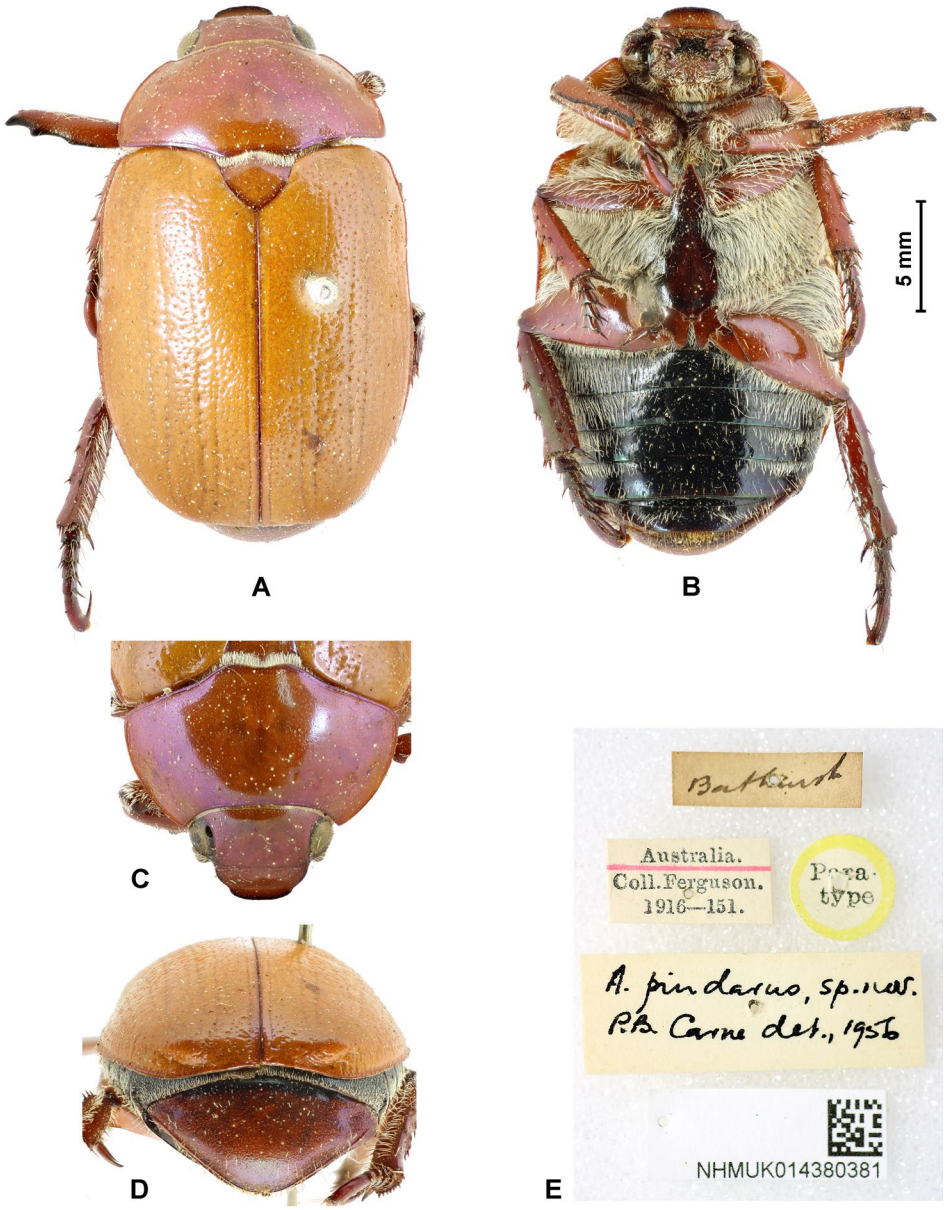

Fig. 14. *Anoplognathus pindarus*, invalid paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

Anoplognathus quadrilineatus Waterhouse, 1874 (Fig. 15)

Anoplognathus quadrilineatus Waterhouse, 1874: 538.

Anoplognathus abnormis Macleay, 1873: 359 (subjective synonymy by Carne 1957: 125).

Type material examined. *Anoplognathus quadrilineatus*: 1 ♀, syntype: "Type // Queens--land. | 74. 32. // Anoplognathus quadrilineatus, (Type) C.Waterh. // SYNTYPE ♀ Anoplognathus quadrilineatus Waterhouse, 1874 det. Seidel 2023 // NHMUK014380410".

Remarks. Currently recognized as a junior subjective synonym of *A. abnormis*. Waterhouse (1874) did not designate a holotype and had both male and female specimens at hand. We therefore consider this specimen to be a syntype.

Anoplognathus suturalis Boisduval, 1835

Anoplognathus suturalis Boisduval, 1835: 178.

Anoplognathus hirsutus Burmeister, 1844: 447, syn.n. (Fig. 16).

Type material examined. *Anoplognathus hirsutus* (in MLUH): 1 ♂, lectotype (here designated): "hirsutus * Holl. nov. // LECTOTYPE / Anoplognathus hirsutus Burmeister, 1844 des. Seidel 2020 // WORLD SCARAB. DATABASE WSD00346044"; 1 ♀, paralectotype: "hirsutus * Holl. nov. // PARALECTOTYPE / Anoplognathus hirsutus Burmeister, 1844 des. Seidel 2020 // WORLD SCARAB. DATABASE WSD00346045".

Remarks. Currently recognized as a valid species. Carne (1957) distinguished between *A. suturalis* and *A. hirsutus*, but misinterpreted the latter taxon. The types of *A. hirsutus* deposited in MLUH are conspecific with specimens identified by Carne as *A. suturalis* (*A. suturalis* types not studied), and *A. hirsutus* becomes a junior subjective synonym of *A. suturalis*. *Anoplognathus hirsutus* sensu Carne (1957) corresponds to *A. explanatus*. Burmeister (1844) did not designate a holotype and had both male and female specimens at hand. A lectotype is designated to fix the identity of *A. hirsutus*.

Genus *Anoplostethus* Brullé, 1837

Panschizus pallidus Blackburn, 1888 (Fig. 17)

Panschizus pallidus Blackburn, 1888: 51.

Anoplostethus opalinus Brullé, 1837: 376 (subjective synonymy by Ohaus 1918: 173).

Type material examined. 1 ♀, syntype: "P [= Perth] 1701 [handwritten on specimen card] // Type H.T. // Blackburn coll. 1910–236. // Panschizus pallidus, Blackb. // SYNTYPE ♀ Panschizus pallidus Blackburn, 1888 det. Seidel 2023 // NHMUK014380422".

Remarks. Currently recognized as a junior subjective synonym of *Anoplostethus opalinus* Brullé, 1837. Blackburn (1888) did not designate a holotype but mentions two specimens. We therefore consider this specimen to be a syntype.

Genus *Bilobatus* Machatschke, 1970

Bilobatus luridipennis (Waterhouse, 1878) (Fig. 18)

Homotropus luridipennis Waterhouse, 1878: 227.

Type material examined. 1 ♂, lectotype: "Type // N. Holl. | 48 · 144 // Homotropus luridipennis, (Type.) C.Waterh. // BILOBATUS LURIDIPENNIS (WATERHOUSE) Det:A.B.T.Smith 2001 //

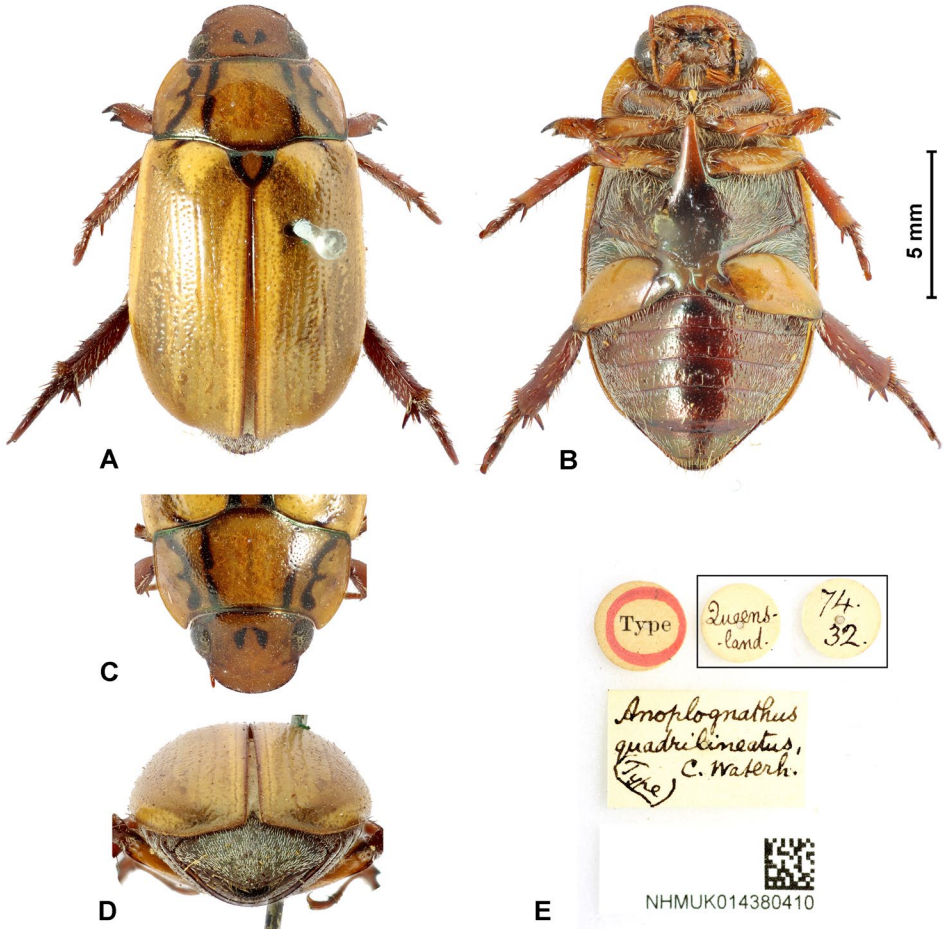

Fig. 15. *Anoplognathus quadrilineatus* [junior synonym of *Anoplognathus abnormis*], syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

LECTOTYPE ♂ Homotropus luridipennis Waterhouse des. P. Allsopp 2017 // Bilobatus luridipennis (Waterhouse) des. P. Allsopp 2017 // NHMUK014380391"; 1 ♂, paralectotype: "N. Holl. | 48·144 // Bilobatus luridipennis (Waterhouse) det. P. Allsopp 2017 // PARALECTOTYPE ♂ Homotropus luridipennis Waterhouse, 1878 des. Allsopp 2021 labelled by Seidel 2023 // NHMUK015529933".

Remarks. Currently recognized as a valid species. Allsopp (2021) designated the lectotype for this species. He also states that the paralectotype is labelled with "PARA-LECTOTYPE ♂ Homotropus luridipennis Waterhouse des. P. Allsopp 2017", which is not the case.

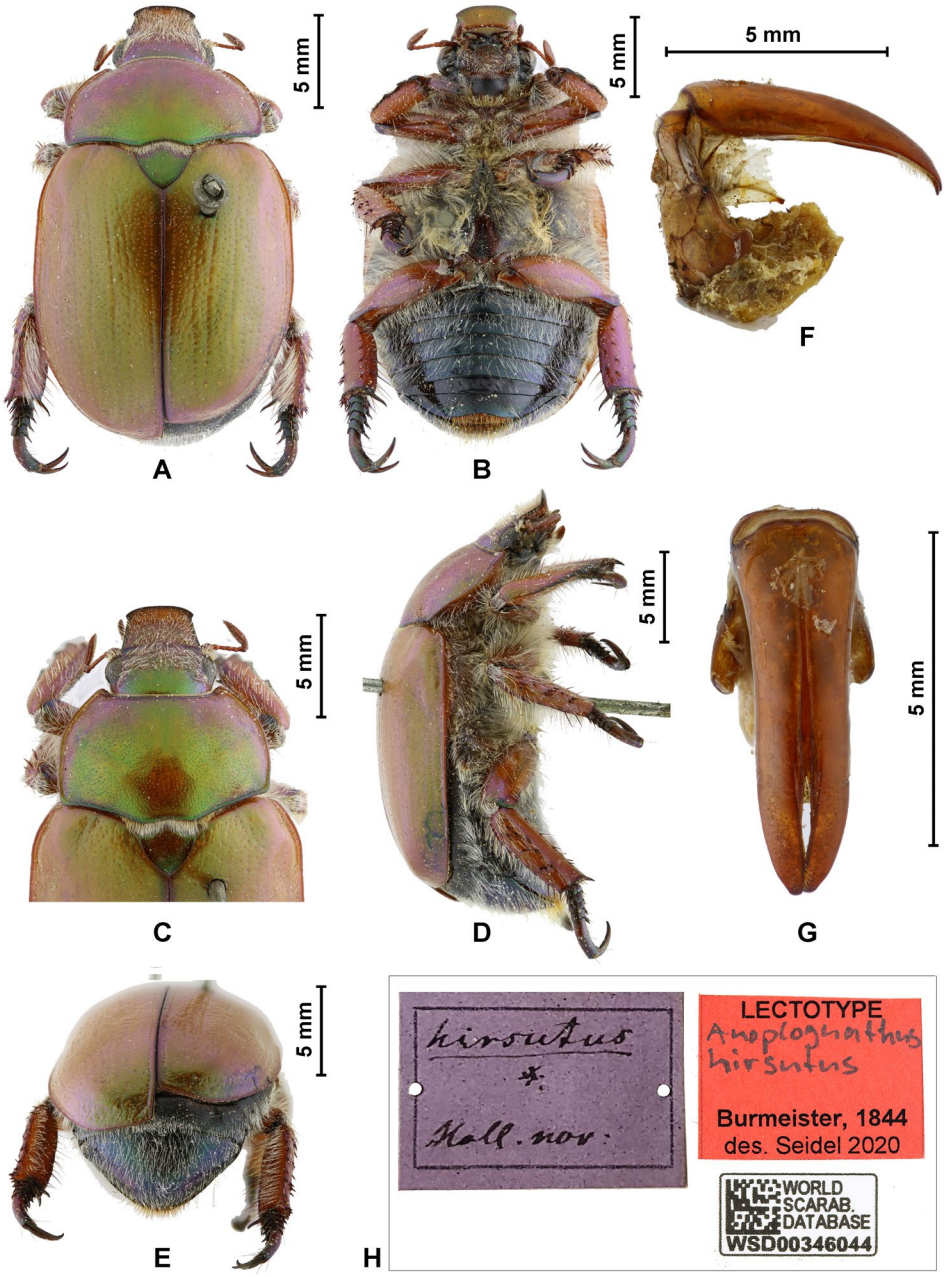

Fig. 16. *Anoplognathus hirsutus* [junior synonym of *Anoplognathus suturalis*], lectotype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) lateral view; (E) pygidium; (F) aedeagus, lateral view; (G) aedeagus, frontal view; (H) labels.

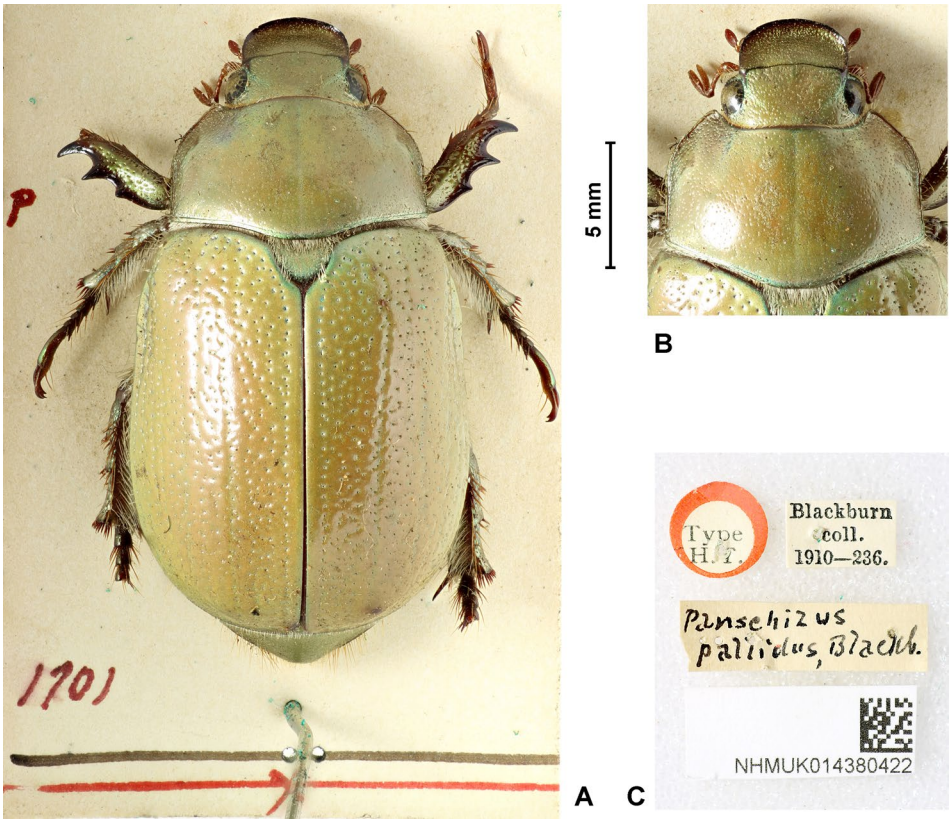

Fig. 17. *Panschizus pallidus* [junior synonym of *Anoplostethus opalinus*], syntype. (A) Dorsal habitus; (B) ventral habitus; (C) labels.

Genus *Calloodes* White, 1845

Calloodes atkinsonii Waterhouse, 1868 (Fig. 19)

Calloodes atkinsonii Waterhouse, 1868: 9.

Type material examined. 1♂, syntype: "Type // N.E. Australia | 68. 23. // Atkinsonii C. Waterh. (Type.) Ent. Month. Mag. May. 1868. // SYNTYPE ♂ Calloodes atkinsonii Waterhouse, 1868 det. Seidel 2023 // NHMUK014192231".

Remarks. Currently recognized as a valid species. In the original description, Waterhouse (1868) gives a size range for the species, which indicates that he had more than one specimen. Therefore, we consider the specimen to be a syntype.

Calloodes grayianus (White, 1845) (Fig. 20)

Anoplognathus (*Calloodes*) *grayianus* White, 1845: 38.

Calloodes grayanus: Ohaus 1904: 72 (incorrect subsequent spelling).

Type material examined. 1♂, syntype: "Type // n. Holl n.w Coast | 44 · 14 // Grayianus. White 6338 // SYNTYPE ♂ Anoplognathus (Calloodes) grayianus White, 1845 det. Seidel 2023 //

NHMUK014192230"; 1 ♂ syntype: "New Holl | 44 · 14 // SYNTYPE ♂ Anoplognathus (Calloodes) grayianus White, 1845 det. Seidel 2023 // NHMUK015529311".

Remarks. Currently recognized as a valid species. In the original description, White (1845) gives a size range for the species, which indicates that he had more than one specimen. Therefore, we consider the specimens to be syntypes.

Genus *Eosaulostomus* Carne, 1956

Eosaulostomus collaris (Blackburn, 1892) (Fig. 21)

Aneurystypus collaris Blackburn, 1892a: 286.

Type material examined. 1 ♂, syntype: "3335 Eyre's T [handwritten on specimen card] // Type H.T. // Blackburn coll. 1910–236. // Saulostomus (Aneurystypus) collaris, Blackb. // SYNTYPE ♂ Aneurystypus collaris Blackburn, 1892 det. Seidel 2023 // NHMUK014380384".

Remarks. Currently recognized as a valid species. Blackburn (1892a) did not designate a holotype or indicate the number of specimens. We therefore consider this specimen to be a syntype.

Eosaulostomus excisus Carne, 1956 (Fig. 22)

Eosaulostomus excisus Carne, 1956: 68.

Type material examined. 1 ♂, paratype: "Para-type // Reevesby Isl. S Aust Dec 1936 // McCoy Soc. Exped Sir Jos. Banks Group South Australia Dec 1936 – Jan, 1937 // NATIONAL MUSEUM VICTORIA // Brit. Mus. 1956-127. // Eosaulostomus excisus sp.n. P.B. Carne det. 1954 // NHMUK014380387".

Remarks. Currently recognized as a valid species.

Eosaulostomus halei Carne, 1956 (Fig. 23)

Eosaulostomus halei Carne, 1956: 69.

Type material examined. 1 ♂, paratype: "Para-type // Owieandana N. Flinders Ra Hale & Tindale // Belongs to S.A.Museum // Brit. Mus. 1956-127. // Eosaulostomus halei sp.n. P.B. Carne det. 1954 // NHMUK014380385".

Remarks. Currently recognized as a valid species.

Eosaulostomus mimicus (Lea, 1919) (Fig. 24)

Saulostomus mimicus Lea, 1919: 247.

Eosaulostomus minicus: Carne 1956: 70 (incorrect subsequent spelling).

Type material examined. 1 ♂, syntype: "Co-type // Q'land. Australia. 1920–332 // Cunnamulla Q H Hardcastle // Saulostomus mimicus Lea Queensland. Cotype // SYNTYPE ♂ Saulostomus mimicus Lea, 1919 det. Seidel 2023 // NHMUK014380388".

Remarks. Currently recognized as a valid species. Lea (1919) did not designate a holotype and had both male and female specimens at hand. We therefore consider this specimen to be a syntype.

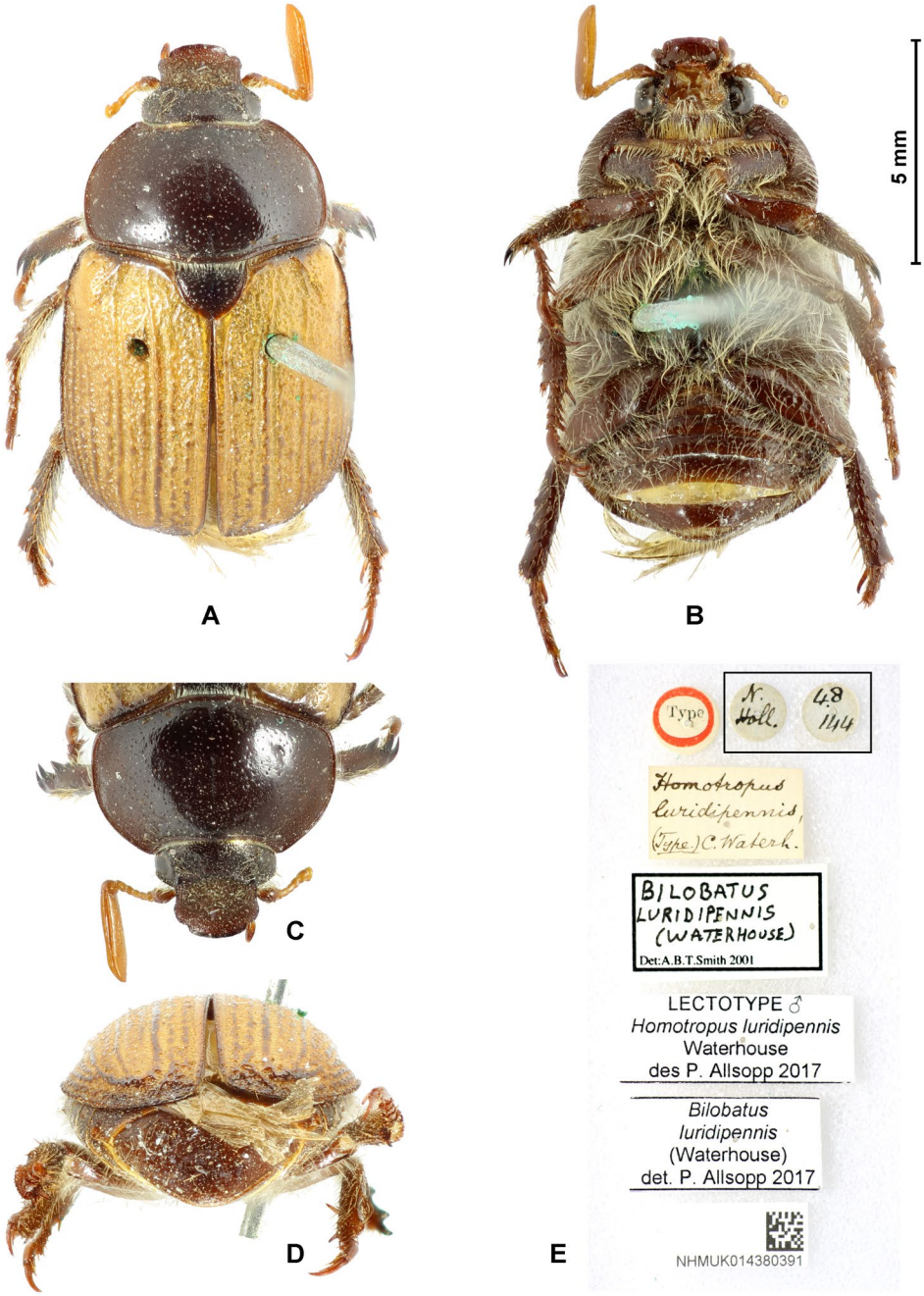

Fig. 18. *Bilobatus luridipennis*, lectotype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

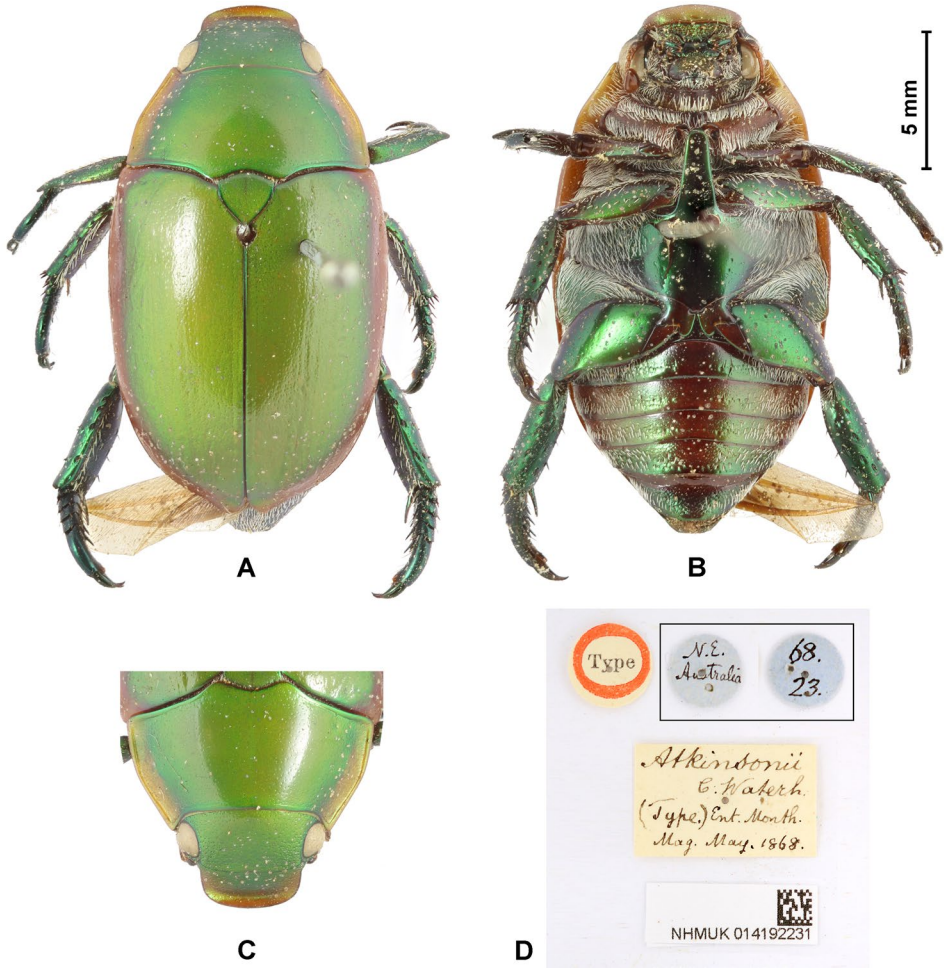

Fig. 19. *Calloodes atkinsonii*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) labels.

Eosaulostomus norsemanae **Carne, 1956** (Fig. 25)

Eosaulostomus norsemanae Carne, 1956: 68.

Type material examined. 1♂, paratype: "Para-type // Norseman W. Aust. // NATIONAL MUSEUM VICTORIA // Brit. Mus. 1956-124. // Eosaulostomus norsemanae sp.n. P.B. Carne det. 1954 // NHMUK014380397".

Remarks. Currently recognized as a valid species.

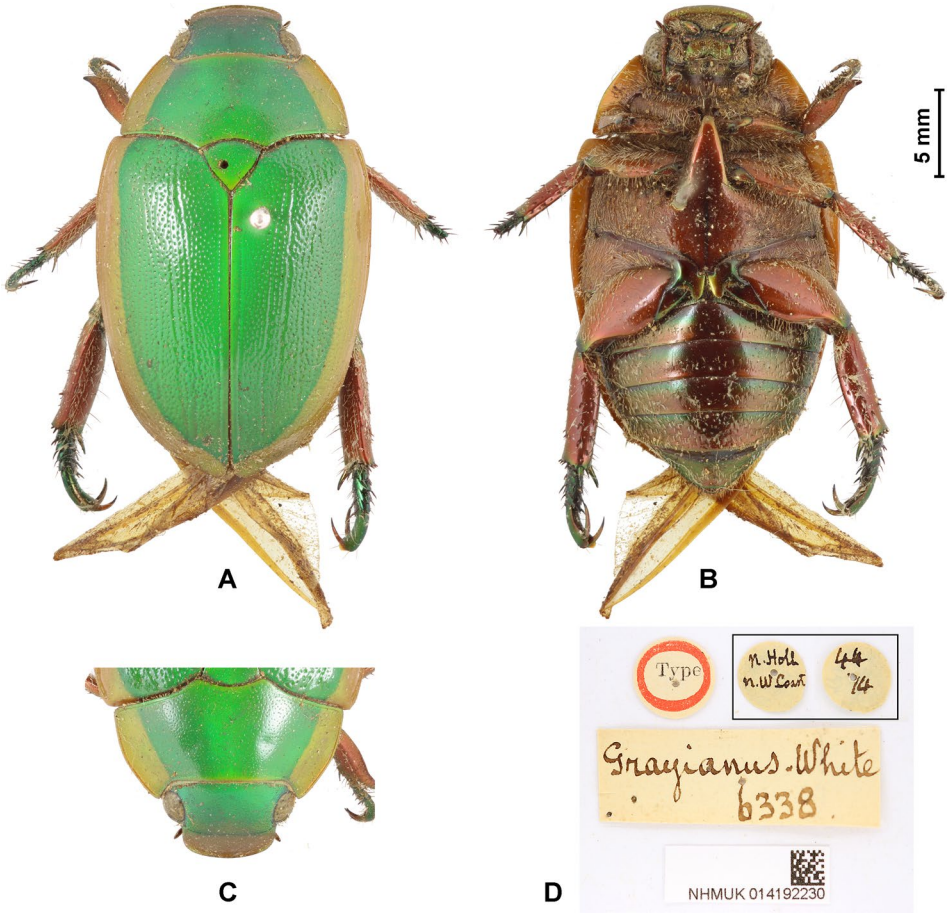

Fig. 20. *Calloodes grayianus*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) labels.

Genus *Epichrysus* White, 1841

Epichrysus lamprimoides (White, 1841) (Fig. 26)

Brachysternus (*Epichrysus*) *lamprimoides* White, 1841: 460.

Type material examined. 1♂, syntype: "Type // K Geo Sound [= King George Sound, now Albany] | Capt Grey // Epichrysus lamprimoides, type a.White // SYNTYPE ♂ Brachysternus (Epichrysus) lamprimoides White, 1841 det. Seidel 2023 // NHMUK014380414".

Remarks. Currently recognized as a valid species. White (1841) did not designate a holotype and indicated in his statement "elytra in some specimens of a rich, lively, metallic, yellowish green" that he had multiple specimens. We therefore consider this specimen to be a syntype.

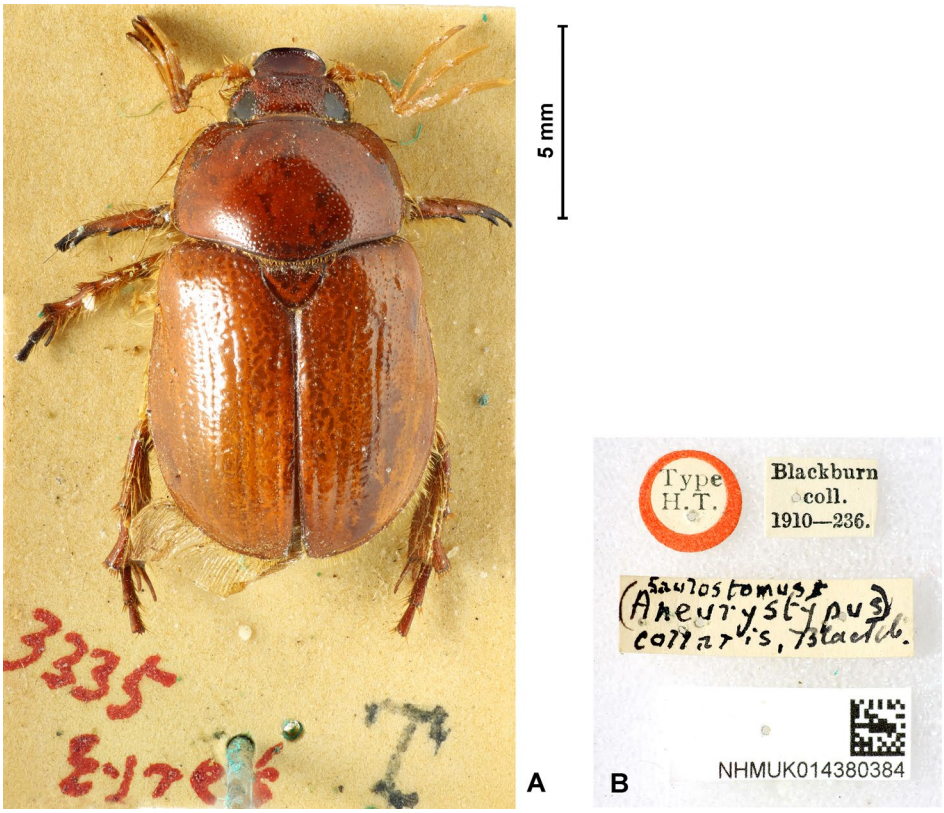

Fig. 21. *Eosaulostomus collaris*, syntype. (A) Dorsal habitus; (B) labels.

Genus *Mesystoechus* Waterhouse, 1878

Mesystoechus ciliatus Waterhouse, 1878 (Fig. 27)

Mesystoechus ciliatus Waterhouse, 1878: 228.

Type material examined. 1♂, lectotype: "Type // 61 53 | Moreton Bay // Mesystoechus ciliatus, (Type) C. Waterh. // HOLOTYPE ♂ Mesystoechus ciliatus Waterhouse det. P. Allsopp 2017 // LECTOTYPE ♂ Mesystoechus ciliatus Waterhouse, 1878 des. Allsopp 2021 labelled by Seidel 2023 // NHMUK014380390".

Remarks. Currently recognized as a valid species. Allsopp (2021) designated the lectotype for this species. Allsopp (2021) states that the lectotype is labelled with "LECTOTYPE ♂, Mesystoechus ciliatus Waterhouse des. P. Allsopp 2021", which is not the case.

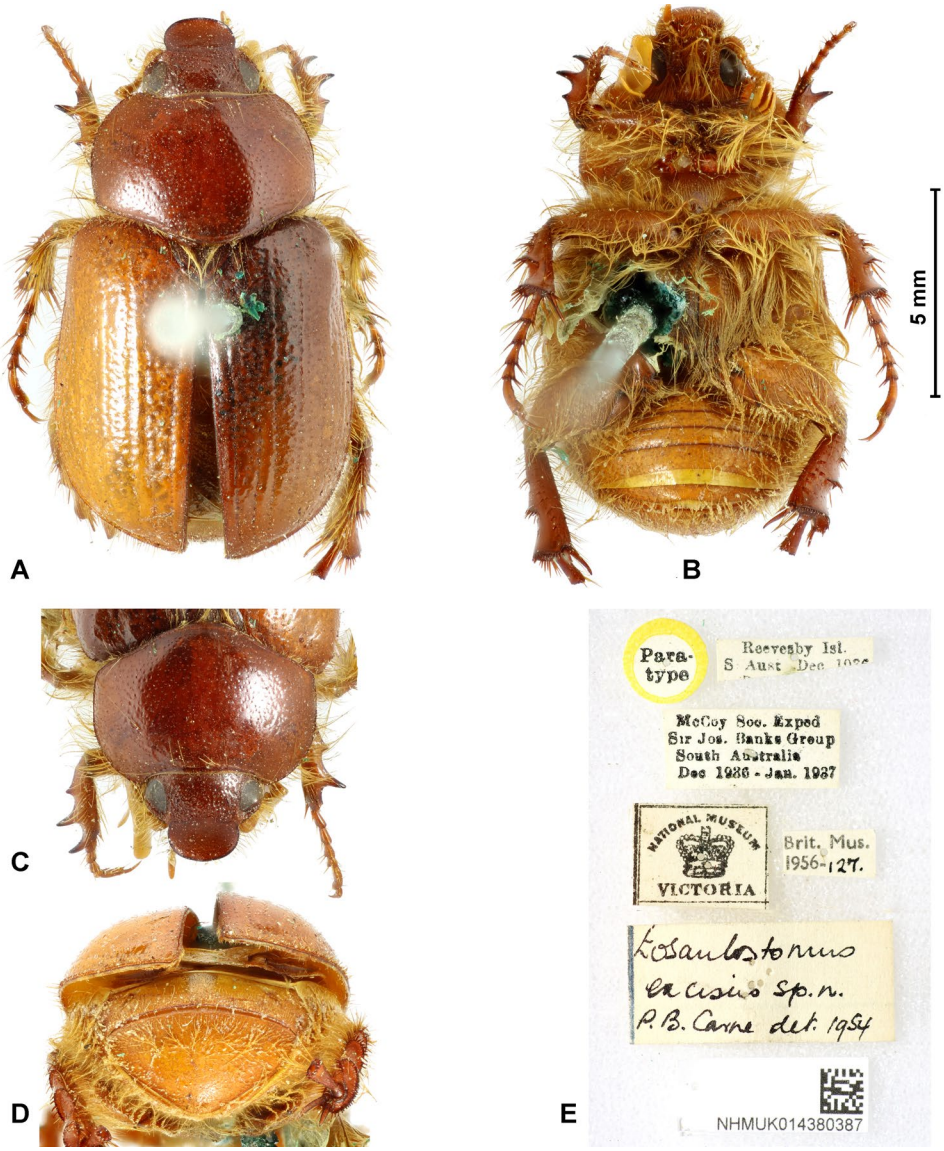

Fig. 22. *Eosaulostomus excisus*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

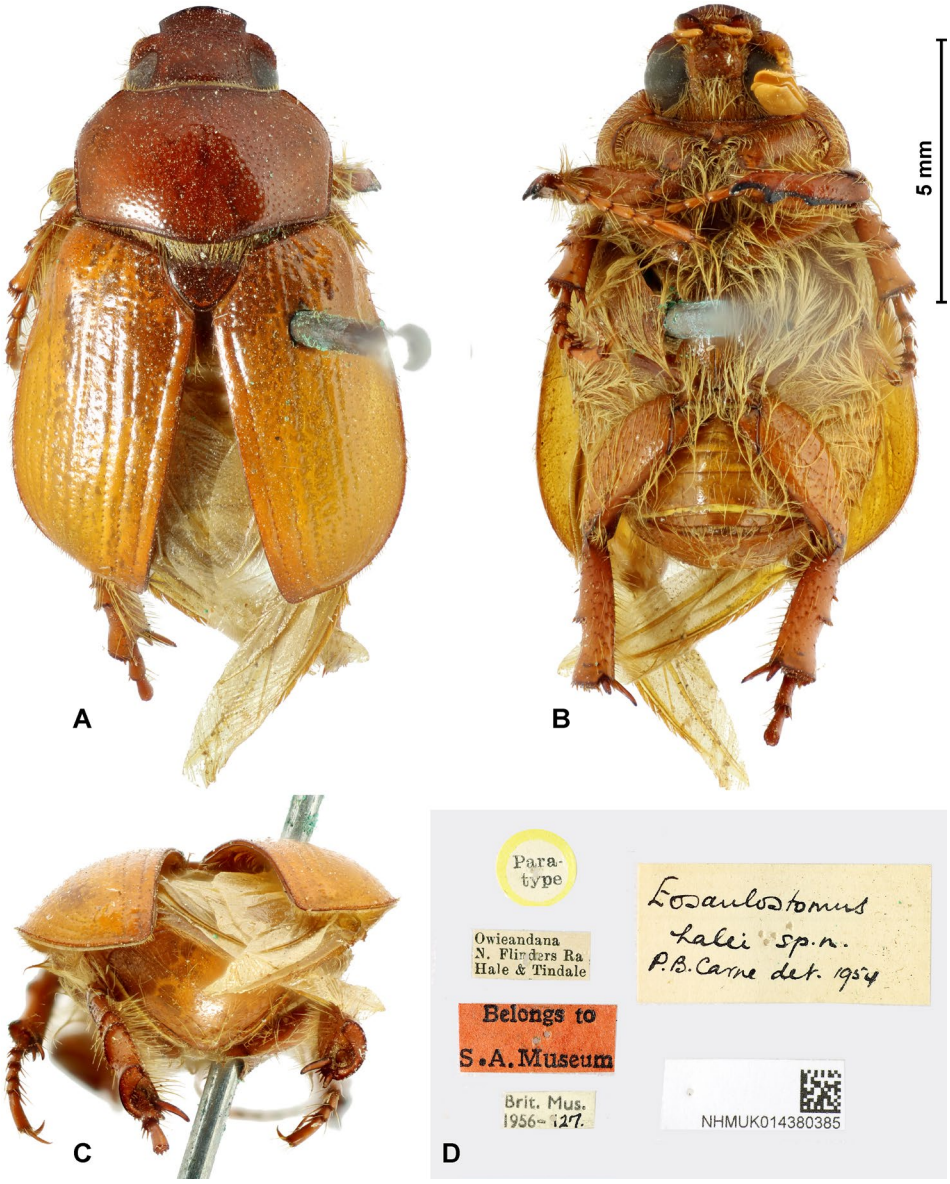

Fig. 23. *Eosaulostomus halei*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) pygidium; (D) labels.

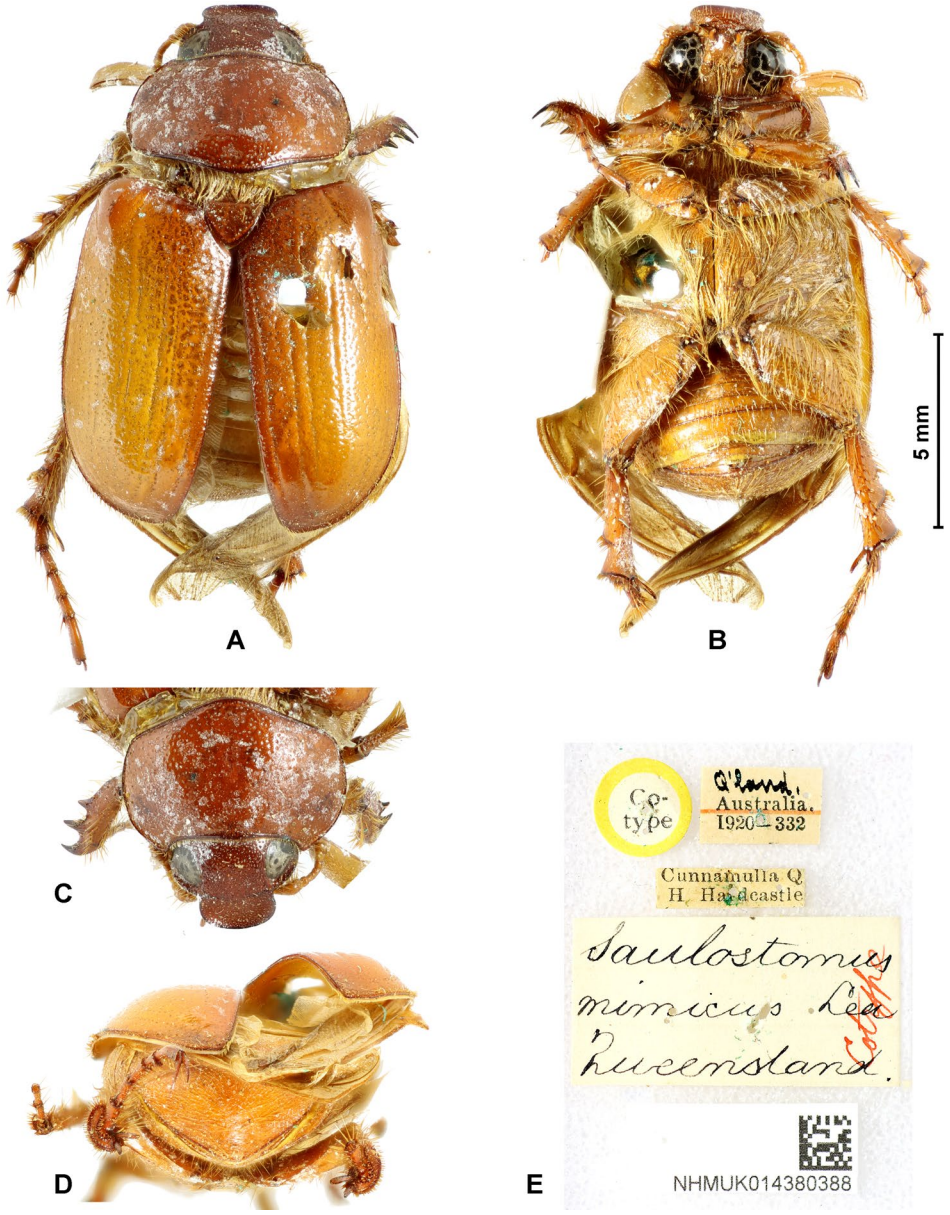

Fig. 24. *Eosaulostomus mimicus*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

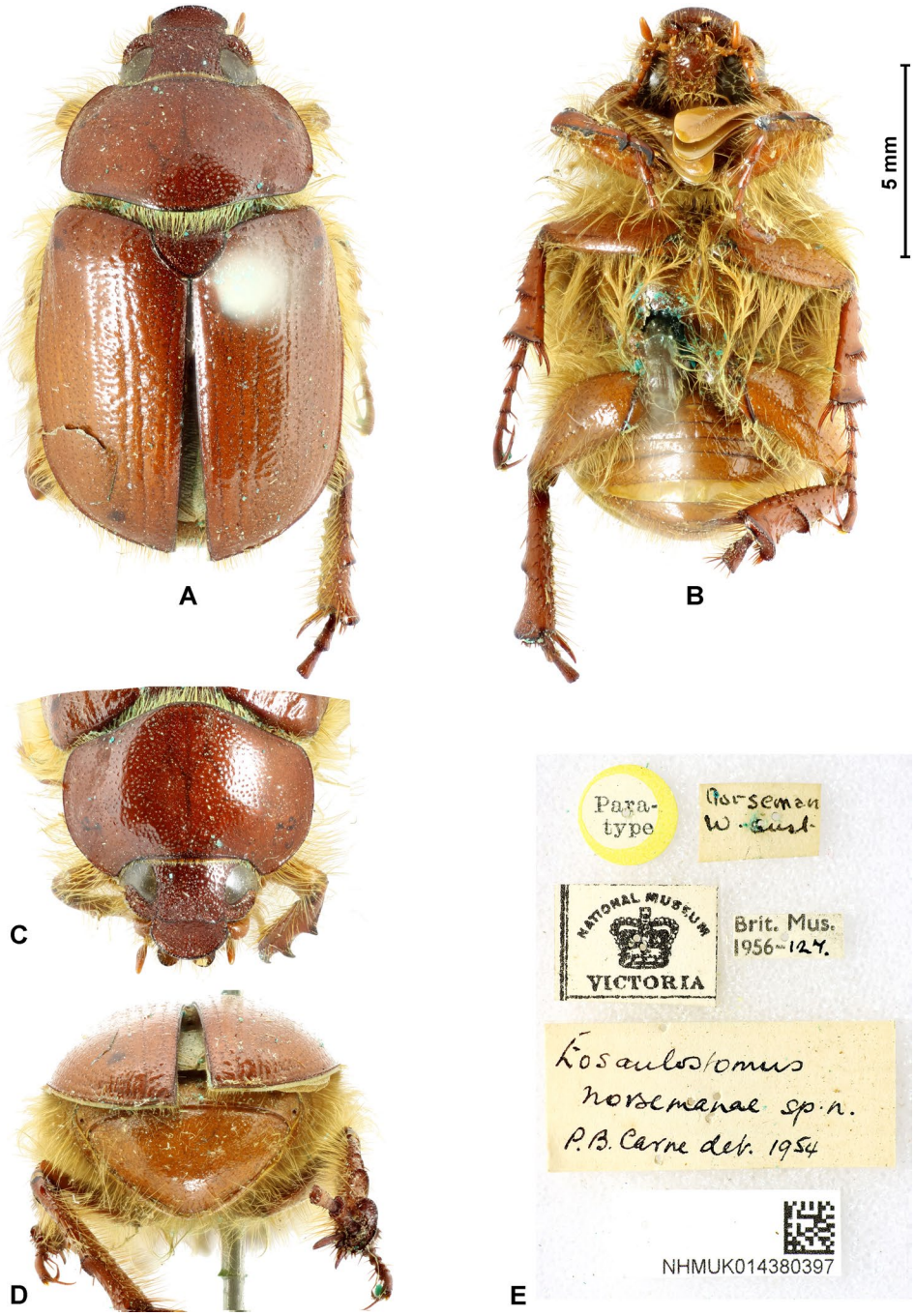

Fig. 25. *Eosaulostomus norsemanae*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

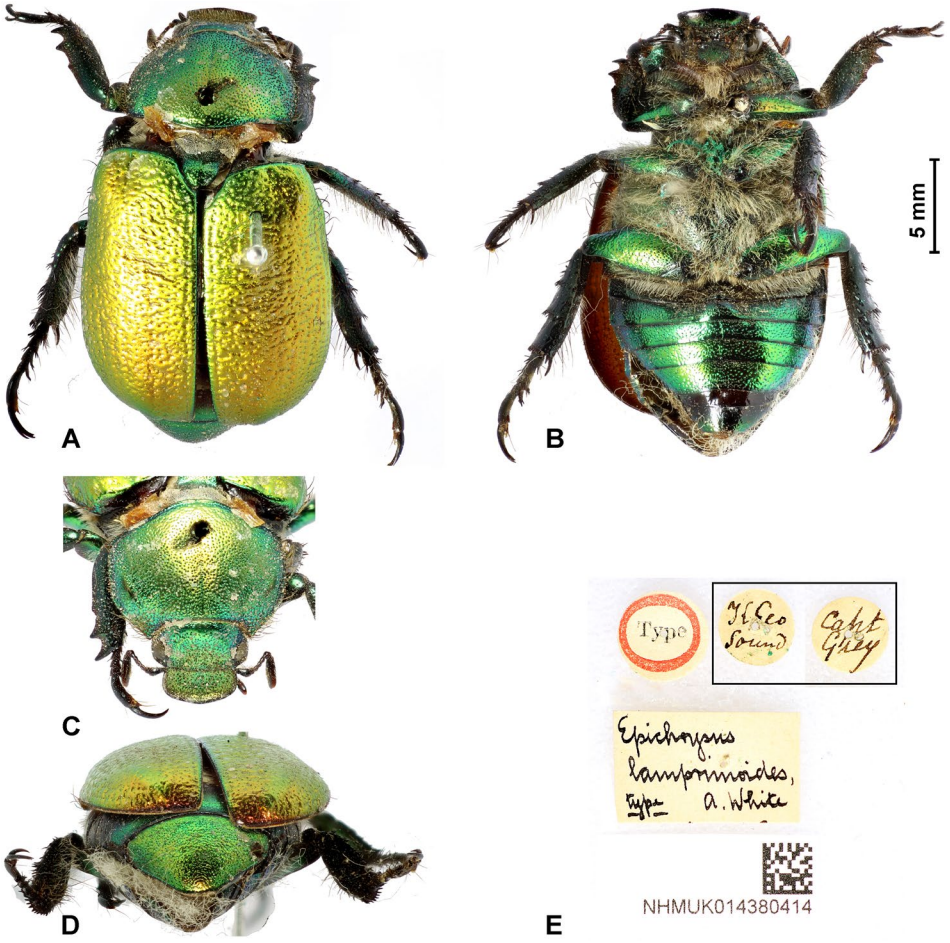

Fig. 26. *Epichrysus lamprimoides*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

Genus *Paraschizognathus* Ohaus, 1904

***Paraschizognathus elgatus* Carne, 1958** (Fig. 28)

Paraschizognathus elgatus elgatus Carne, 1958: 192.

Type material examined. 1♂, paratype: "Para-type // Mt. Gingera A.C.T. 6,000 ft 11 - 2 - 1953 I.F.B.Common. // PARATYPE ♂ Paraschizognathus elgatus elgatus, sp. nov. P.B. Carne det. 1956 // PARASCHIZOGNATHUS ELGATUS CARNE det. M.L. Jameson 2009 // NHMUK0143.80370".

Remarks. Currently recognized as a valid species.

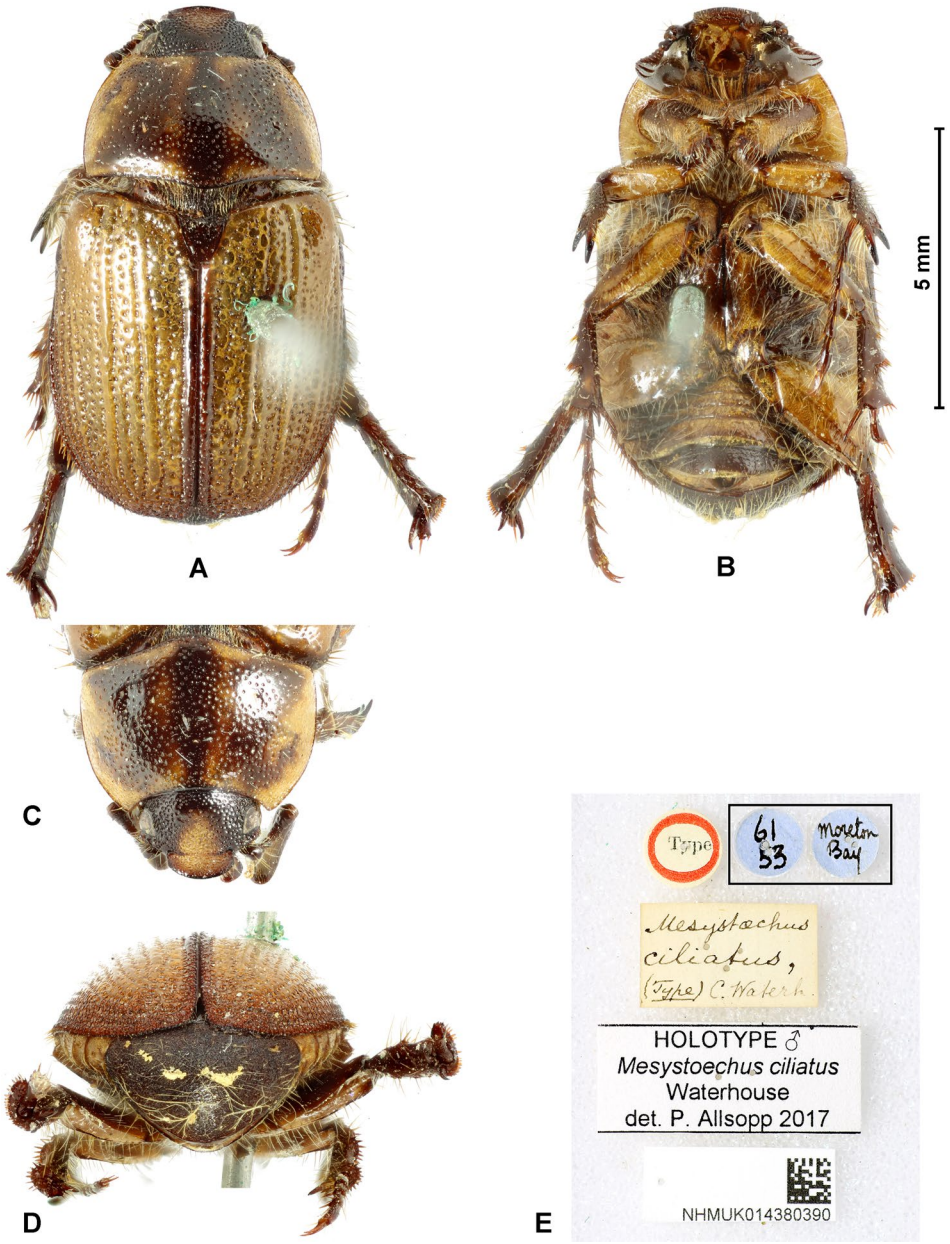

Fig. 27. *Mesystoechus ciliatus*, lectotype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

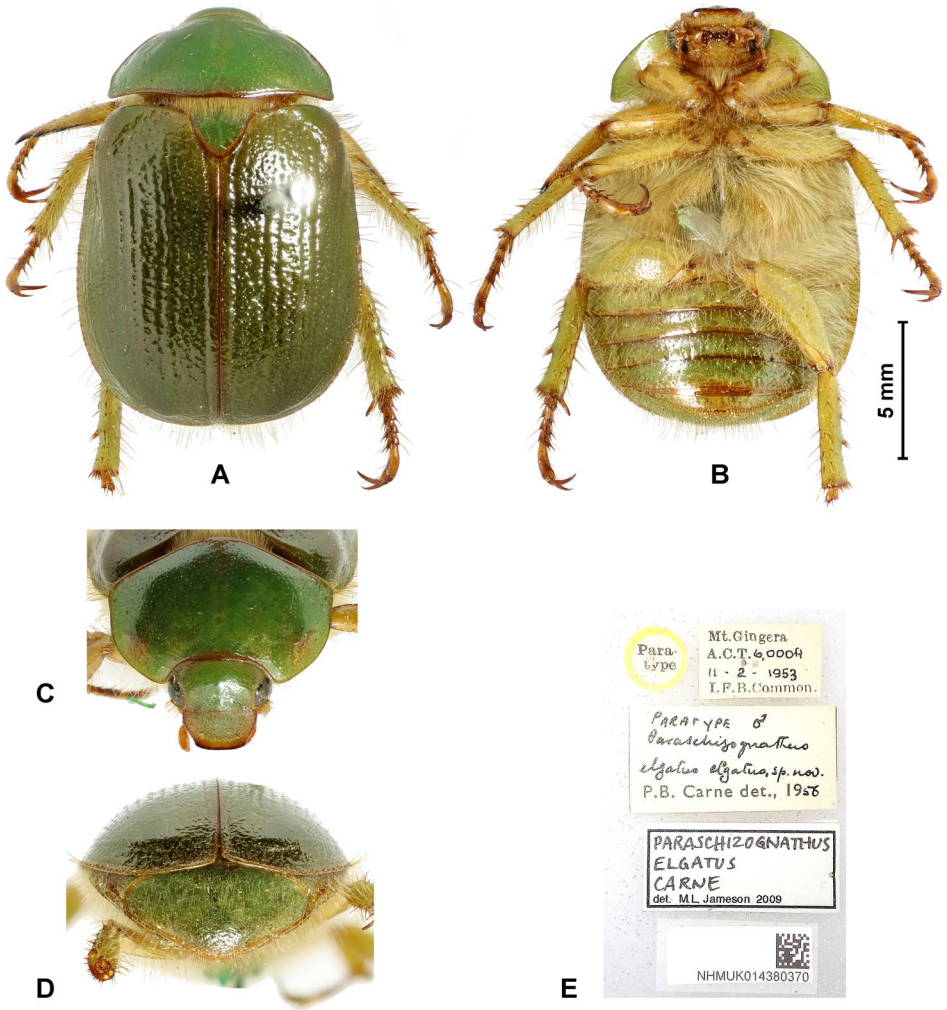

Fig. 28. *Paraschizognathus elgatus*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

***Paraschizognathus frazieri* Carne, 1974** (Fig. 29)

Paraschizognathus frazieri Carne, 1974: 262.

Type material examined. 1♂, paratype: "STATE FOREST GIBRALTAR RANGE 30 NOV.1962 C. W. FRAZIER AT LIGHT // 5 // Brit. Mus. 1974-345 // Paraschizognathus frazieri sp.nov. P.B.Carne 1971 PARATYPE // NHMUK014380373".

Remarks. Currently recognized as a valid species.

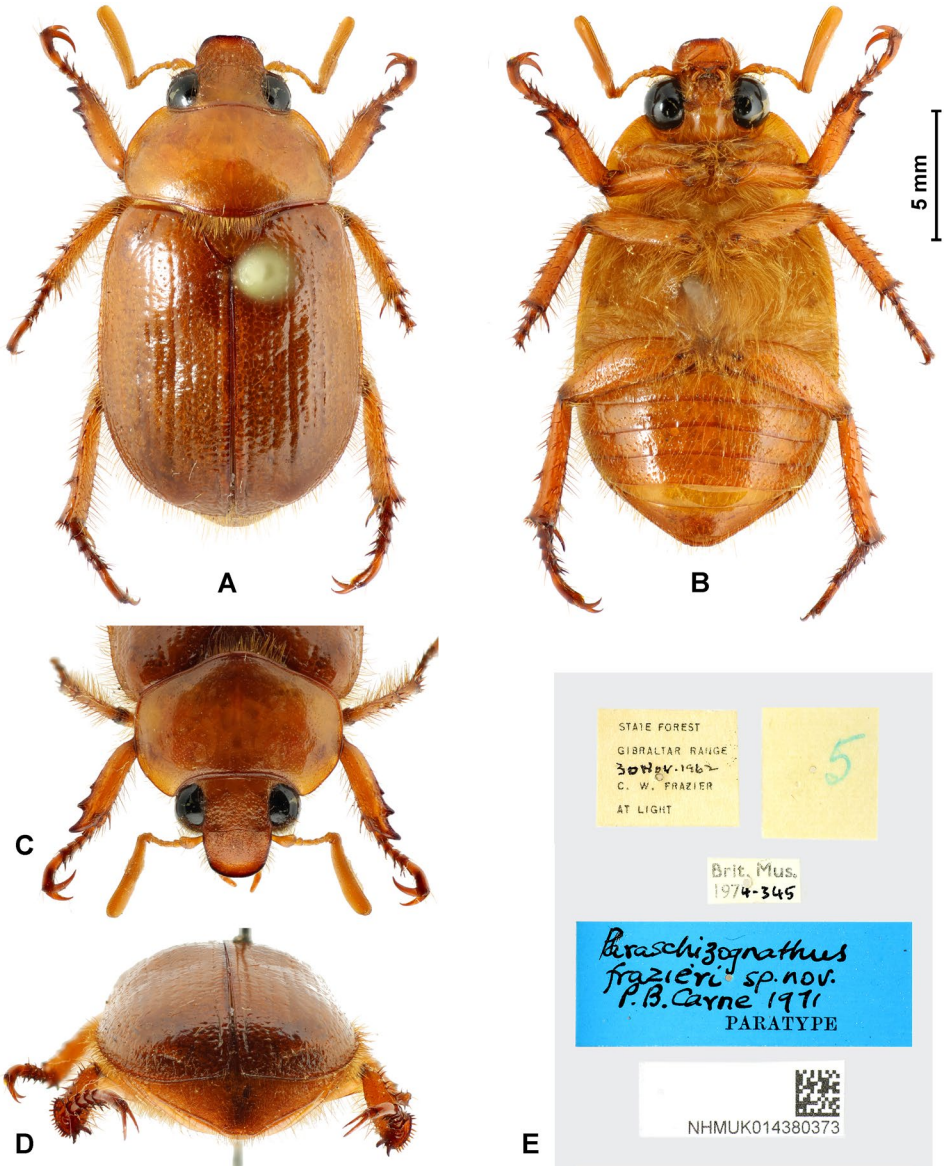

Fig. 29. *Paraschizognathus frazieri*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

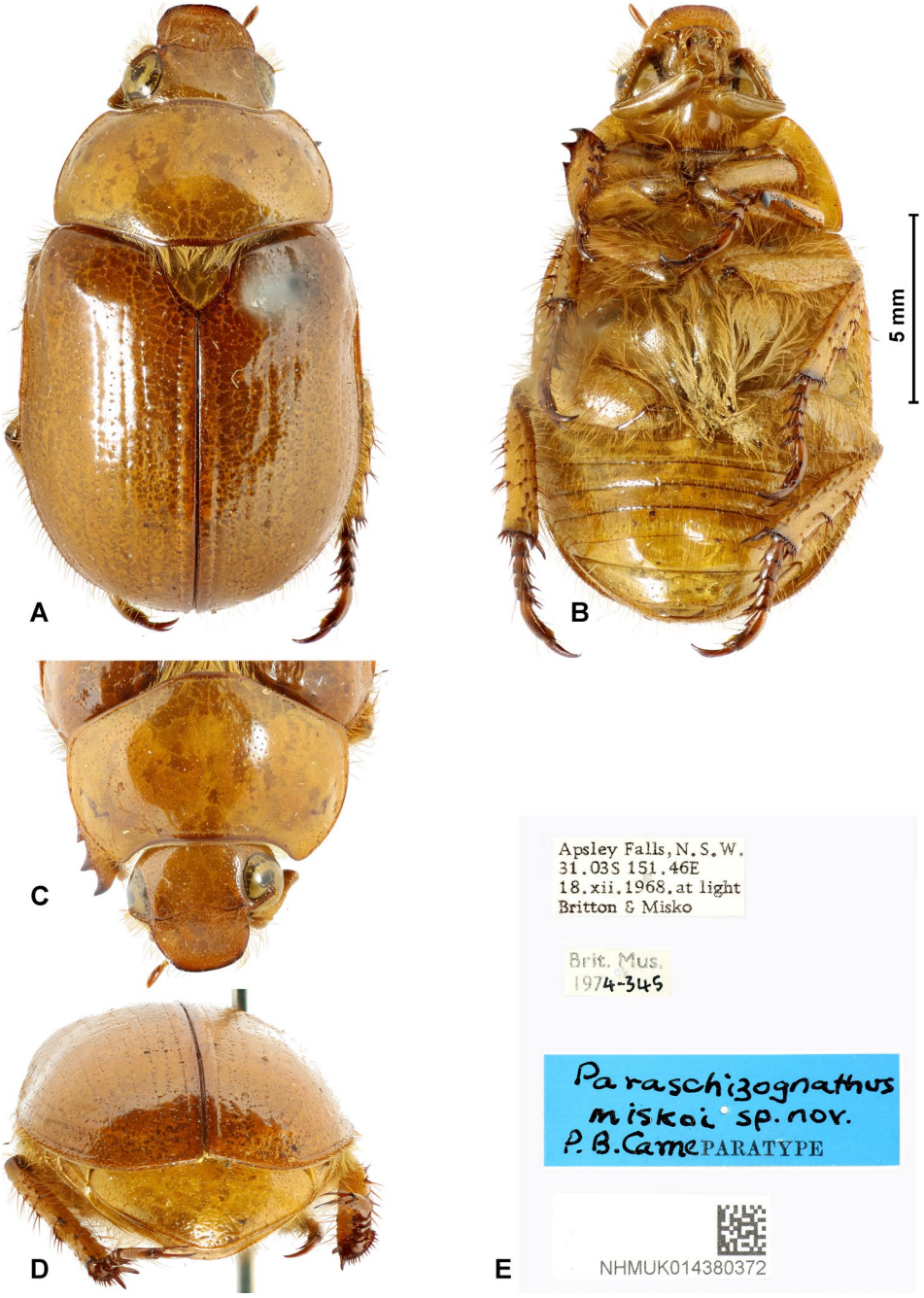

Fig. 30. *Paraschizognathus miskoi*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

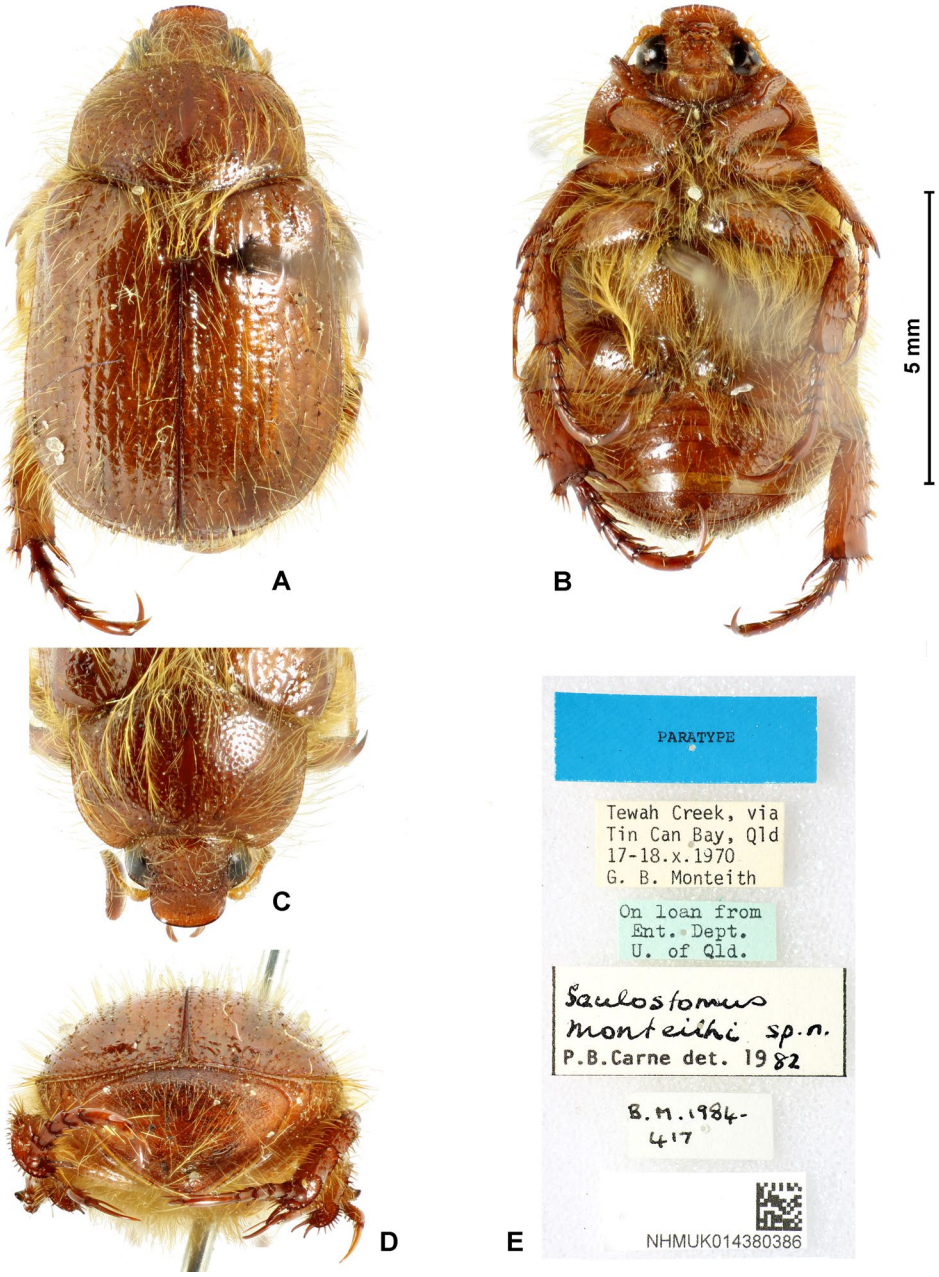

Fig. 31. *Saulostomus monteithi*, paratype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

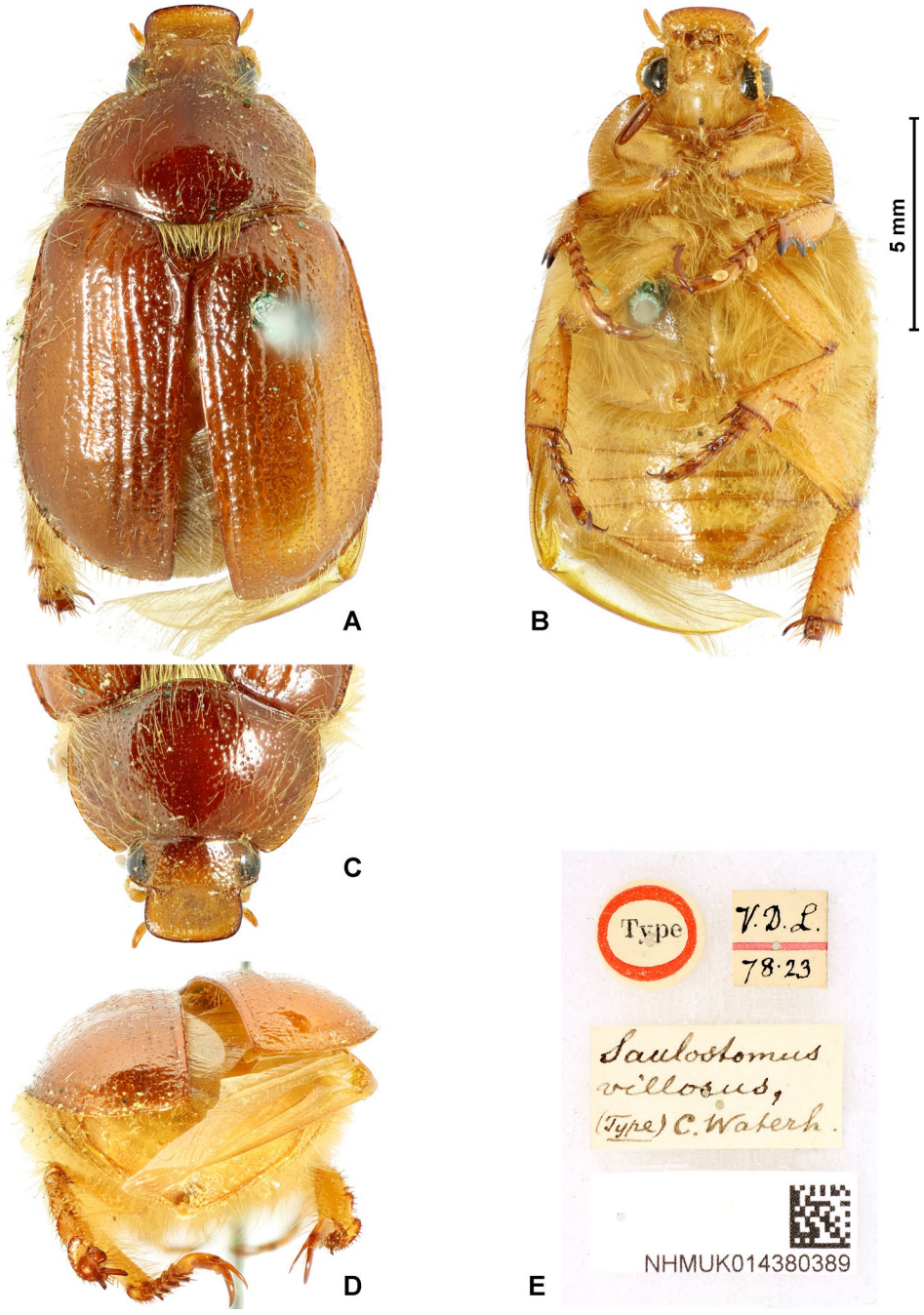

Fig. 32. *Saulostomus villosus*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

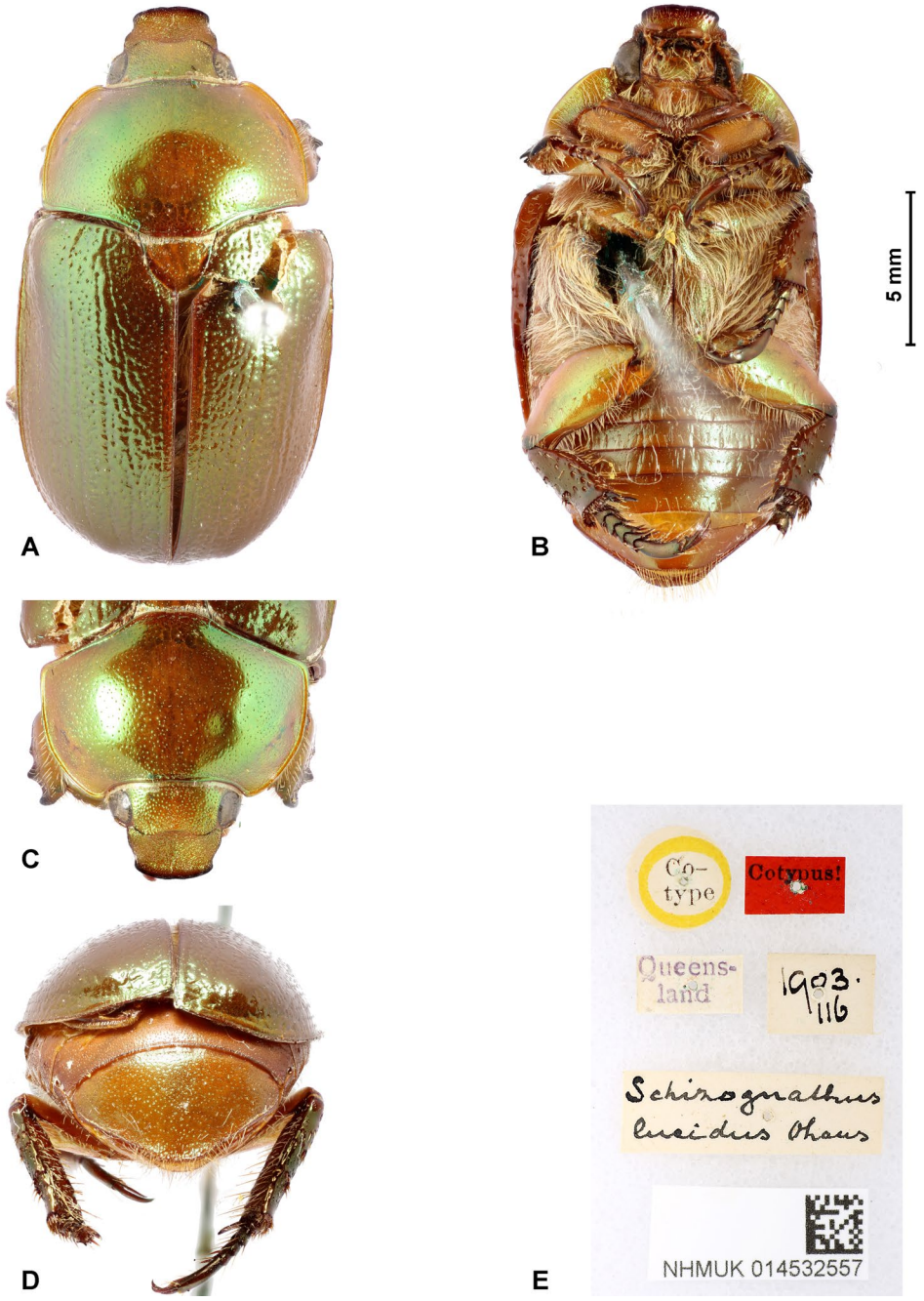

Fig. 33. *Schizognathus lucidus*, syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

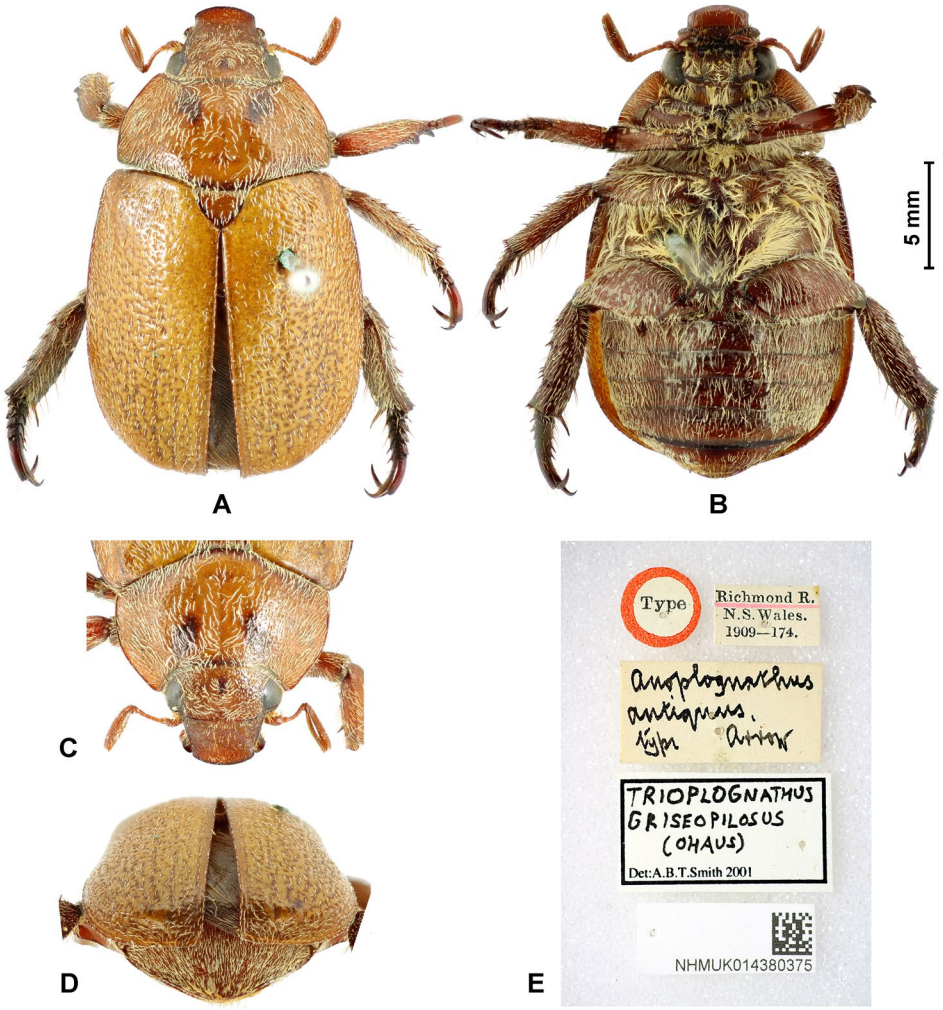

Fig. 34. *Anoplognathus antiquus* [junior synonym of *Trioplognathus griseopilosus*], syntype. (A) Dorsal habitus; (B) ventral habitus; (C) frontal view; (D) pygidium; (E) labels.

Paraschizognathus miskoi **Carne, 1974** (Fig. 30)

Paraschizognathus miskoi Carne, 1974: 263.

Type material examined. 1♂, paratype: "Apsley Falls, N.S.W. 31.03S 151.46E 18.xii.1968. at light Britton & Misko // Brit. Mus. 1974-345 // Paraschizognathus miskoi sp.nov. P.B.Carne 1971 PARATYPE // NHMUK014380372".

Remarks. Currently recognized as a valid species.

Genus *Saulostomus* Waterhouse, 1878

Saulostomus monteithi Carne, 1985 (Fig. 31)

Saulostomus monteithi Carne, 1985: 73.

Type material examined. 1♂, paratype: "PARATYPE // Tewah Creek, via Tin Can Bay, Qld 17-18.x.1970 G. B. Monteith // On loan from Ent. Dept. U. of Qld. // Saulostomus monteithi sp.n. P.B.Carne det. 1982 // B.M. 1984-417 // NHMUK014380386".

Remarks. Currently recognized as a valid species.

Saulostomus villosus Waterhouse, 1878 (Fig. 32)

Saulostomus villosus Waterhouse, 1878: 225.

Type material examined. 1♂, syntype: "Type // V.D.L. [= Van Diemen's Land, now Tasmania] 78·23 // Saulostomus villosus, (Type) C. Waterh. // SYNTYPE ♂ Saulostomus villosus Waterhouse, 1878 det. Seidel 2023 // NHMUK014380389".

Remarks. Currently recognized as a valid species. Waterhouse (1878) did not designate a holotype or indicate the number of specimens. We therefore consider this specimen to be a syntype.

Genus *Schizognathus* Fischer von Waldheim, 1823

Schizognathus lucidus Ohaus, 1904 (Fig. 33)

Schizognathus lucidus Ohaus, 1904: 142.

Type material examined. 1♂, syntype: "Co- type // Cotypus! // Queens-land // 1903.116 // Schizognathus lucidus Ohaus // SYNTYPE ♂ Schizognathus lucidus Ohaus, 1904 det. Seidel 2023 // NHMUK014532557".

Remarks. Currently recognized as a valid species. In the original description, Ohaus (1904) lists several unrelated names as the type "locality": Queensland, Cap York, Dawson District, Brisbane. Dawson, Cape York and Brisbane are three different locations in Queensland, and it is possible that the word Queensland itself reflects a specimen label. There can be little doubt that this is a syntype as it was accessioned in 1903. In some instances, Ohaus labelled additional material post his original description as cotypes, for example in *Mesomerodon* Ohaus, 1905 (see Seidel et al. 2017). Ohaus (1904) did not designate a holotype and had multiple specimens for the description. We therefore consider this specimen to be a syntype.

Genus *Trioplognathus* Ohaus, 1904

Anoplognathus antiquus Arrow, 1919 (Fig. 34)

Anoplognathus antiquus Arrow, 1919: 382

Trioplognathus griseopilosus Ohaus, 1904: 134 (subjective synonymy by Carne 1958: 199).

Type material examined. 1♂, syntype: "Type // Richmond R. N.S. Wales. 1909–174. Anoplognathus antiquus, type Arrow // TRIOPLOGNATHUS GRISEOPILOSUS (OHAUS) det:A.B.T.Smith 2001 // NHMUK014380375"; 1♀, syntype: "Para-type // Richmond R. N.S.Wales. 1909–174. // Paratype Anoplognathus antiquus Arrow E.B.Britton det. 1955 // SYNTYPE ♀ Anoplognathus antiquus Arrow, 1919 det. Seidel 2023 // NHMUK014380376". 1♀, syntype: "Richmond

R. N.S.Wales. 1909–174. // SYNTYPE ♀ Anoplognathus antiquus Arrow, 1919 det. Seidel 2023 // NHMUK014380377".

Remarks. Currently a subjective junior synonym of *Trioplognathus griseopilosus* Ohaus, 1904. Arrow (1919) did not designate a holotype. We therefore consider the specimens to be syntypes. Carne (1957) examined syntypes of both species.

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