



Taxonomic changes resulting from a review of the types of Australian Anoplognathini (Coleoptera: Scarabaeidae: Rutelinae) housed in Swedish natural history collections

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Abstract

The type material of Australian Anoplognathini (Coleoptera: Scarabaeidae: Rutelinae) housed in Swedish natural history collections is reviewed, concerning three genera: *Anoplognathus* Leach, 1815, *Amblyterus* MacLeay, 1819, and *Repsimus* MacLeay, 1819. The species were described by G.J. Billberg, J.W. Dalman, L. Gyllenhal, C.J. Schönherr, O. Swartz, and C.P. Thunberg. The contemporary type material of W.S. MacLeay in the Macleay Museum, Sydney, is also examined as it has been overlooked by previous researchers. In total, type specimens for 12 species described between 1817 and 1822 were found in the Naturhistoriska Riksmuseet in Stockholm the Evolutionsmuseet in Uppsala and the Macleay Museum. Five of these species are valid: *Anoplognathus brunnipennis*, (Gyllenhal, 1817); *A. olivieri* (Schönherr & Dalman, 1817); *A. porosus* (Dalman, 1817); *Amblyterus cicatricosus* (Gyllenhal, 1817); and *Repsimus manicatus* (Swartz, 1817). The other seven species are junior synonyms, as follows (senior synonym first): *A. brunnipennis* = *Rutela chloropyga* Thunberg, 1822 (**new synonym**); *A. olivieri* = *Rutela lacunosa* Thunberg, 1822 (**new synonym**); *A. viridiaeneus* (Donovan, 1805) = *A. latreillei* (Schönherr & Gyllenhal, 1817); *A. viriditarsus* Leach, 1815 = *Rutela analis* Dalman, 1817; and *R. manicatus* = *Anoplognathus brownii* W.J. MacLeay, 1819 = *A. dytiscoides* W. J. MacLeay, 1819 = *Rutela ruficollis* Thunberg, 1822 (**new synonym**). Authorship of *A. latreillei* and *A. olivieri* is corrected, as noted above. *Anoplognathus brunnipennis* has been misidentified for the last 60 years at least, leading to the synonymy noted above. *Anoplognathus flavipennis* Boisduval, 1835 (**revised status**), is reinstated as the oldest available name for the misidentified *A. brunnipennis* and the types of *A. flavipennis* in the Muséum National d'Histoire Naturelle, Paris, are illustrated. Lectotypes are designated for: *Anoplognathus brownii*, *A. flavipennis*, *A. dytiscoides*, *Melolontha cicatricosa*, *Rutela analis*, *R. brunnipennis*, *R. lacunosa*, *R. latreillei*, *R. manicata*, *R. olivieri*, *R. porosa*, *R. ruficollis*, and *R. chloropyga*. Photographs of all type specimens examined are presented for the first time.

Key words: Australia, Sweden, history, synonymy, nomenclature, Christmas beetle, *Repsimus*, *Anoplognathus*, *Amblyterus*, Dalman, Gyllenhal, Swartz, Thunberg, MacLeay

Introduction

Rutelinae (Coleoptera: Scarabaeidae) in Australia are often abundant, large, shiny, and conspicuous. The common coastal or near-coastal species were rapidly described by many European authors in the early nineteenth century, quickly leading to a redundancy of names. Most species described before 1824 were probably collected in the Sydney area, as until then no other major settlements existed in Australia, and it was the base for early naturalist collectors such as Robert Brown (Burbidge 1966) and John Lewin (Mander-Jones 1967). Phillip Carne was the most recent reviser of the group in Australia, making many synonymic decisions in his revisions (Carne 1957, 1958). However, Carne did not locate or examine many early types, including some named by Swedish naturalists and, more surprisingly, some of the material named by William Sharp MacLeay (1819) preserved in Sydney.

On a recent visit to the Coleoptera collections of the Naturhistoriska riksmuseet in Stockholm (NHRS) and the

Evolutionsmuseet in Uppsala (UUZM), M.S. took the opportunity to check the types of Australian Anoplognathini housed there. In total five Swedish naturalists described species belonging to three anoplognathine genera, *Anoplognathus* Leach, 1815, *Amblyterus* MacLeay, 1819, and *Repsimus* MacLeay, 1819: Gustav Johann Billberg (1772–1844), Johan Wilhelm Dalman (1787–1828), Leonard Gyllenhal (1752–1840), Carl Johan Schönherr (1772–1848), Olof Peter Swartz (1760–1818), and Carl Peter Thunberg (1743–1828). Billberg’s collection was destroyed in 1822 (Horn & Kahle 1935). The type material of *R. caesarea* is described as “Mus[eum]. D[omus]. Gröndal” so it is possible that it was not retained by Billberg. Gröndal is not traceable as an insect collector (Horn & Kahle 1935, 1937) but may be the Dr Carl Gröndahl (1760–1816) who was a plant collector in South Africa and India, supplying specimens to Sahlberg in Finland (Väre 2016). Sahlberg worked with Swartz and Thunberg. Dalman and Swartz’s collections were deposited in NHRS, Gyllenhal’s collection partly in NHRS and partly in UUZM, and Thunberg’s collections were deposited in UUZM (Horn & Kahle 1935, 1936; Ratcliffe 2020). Swedish type specimens of only two species were examined by Carne (1958). The taxa of Thunberg have been largely ignored by later authors including cataloguers. From an Australian viewpoint this is not surprising, as Thunberg gave no indication that any of the species he described were collected in Australia (Thunberg 1822). Similarly, the Coleoptera collections in the Macleay Museum, University of Sydney, Sydney, were searched by C.A.M.R., where the hitherto missing type material of W.S. MacLeay (1792–1865) was successfully located.

In the following work, the identities of all early Australian anoplognathine types in Swedish collections and the Macleay Museum are addressed, and some taxonomic changes are proposed. All types examined are illustrated. Comments on the distributions of species are based on the extensive collection in the Australian Museum, Sydney, Australia.

Material and methods

The following acronyms for the depositories of specimens are used: AMS—Australian Museum, Sydney, Australia; ANIC—Australian National Insect Collection, Canberra, Australia; MMS—Macleay Museum, Sydney, Australia; MNHN—Muséum national d’Histoire naturelle, Paris, France; NHRS—Naturhistoriska riksmuseet, Stockholm, Sweden; and UUZM—Evolutionsmuseet, Uppsala University, Uppsala, Sweden.

Verbatim label data were transcribed using a single slash (/) to separate lines and double slashes (//) to separate labels.

Habitus photographs in Sweden were taken using a Canon EOS 550D digital camera with attached Canon MP-E65 mm f/2.8 1–5× or Canon EFS 60 mm f/2.8 macro USM lens, and subsequently combined using Helicon Focus software. Photographs of specimens in MMS and MNHN were kindly supplied by the curators of those collections. Images for plates were edited in Adobe Photoshop CS5.

Genus *Anoplognathus* Leach, 1815

Anoplognathus brunnipennis (Gyllenhal, 1817)

Rutela brunnipennis Gyllenhal, 1817 (in Schönherr 1817: 62)

Rutela chloropyra Drapiez, 1819: 44; **new synonym**

Rutela chloropyga Thunberg, 1822: 311; **new synonym**

Anoplognathus nitidulus Boisduval, 1835: 176; Ohaus 1918: 170; **new synonym**

Types. *Rutela brunnipennis* Gyllenhal, 1817: lectotype (present designation): ♀: “N: Holland. / Hooker. // NHRS-JLKB / 000029806” (NHRS); *Rutela chloropyga* Thunberg, 1822: lectotype (present designation): ♀: “Uppsala Univ. Zool. Mus. / Thunbergsaml. nr. 3132 / *Rutela chloropyga* / TYP” (UUZM).

Remarks. Lectotypes are designated here for *Anoplognathus brunnipennis* (Fig. 1A–D) and *Rutela chloropyga* (Fig. 1E–H) to fix their identities. Type material of *A. brunnipennis* was not seen by Carne (1957) in his revision of the genus. Examination of Gyllenhal’s lectotype makes it clear that the species was misidentified by Carne and is conspecific with *A. chloropyrus* (Drapiez, 1819), which was described in detail and has been consistently interpreted by subsequent authors (e.g., Carne 1957). Therefore, *A. chloropyrus* is a junior synonym of *A. brunnipennis*. The

lectotype of *Rutela chloropyga* (Fig. 1E–H) is also conspecific with *A. brunnipennis* and therefore these names are placed in synonymy. The validity of the synonymization of *A. nitidulus* with *A. chloropyrus* as proposed by Ohaus (1918) and subsequently listed in Carne (1957), was not examined in this work.

Anoplognathus brunnipennis occurs from Victoria to southeastern Queensland and is a common species around Sydney (AMS). It is distinguished by the rough surfaced but glabrous and brilliant green pygidium (Reid & Smith 2016; Burleigh & Reid 2017).

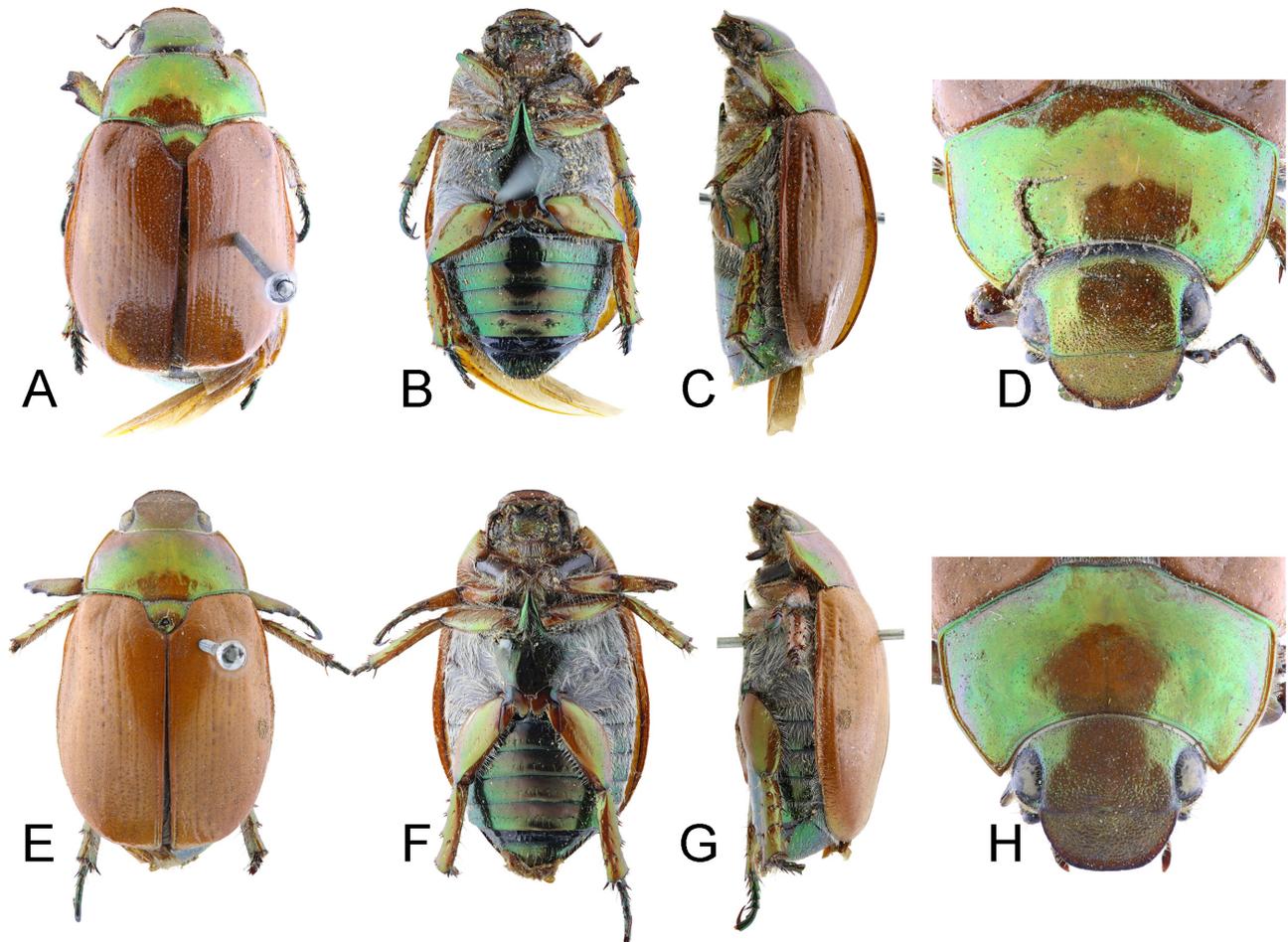


FIGURE 1. Lectotype females of *Anoplognathus brunnipennis* (Gyllenhal, 1817) (A–D) and *Rutela chloropyga* Thunberg, 1822 (E–H). A, E, Dorsal habitus; B, F, ventral habitus; C, G, lateral habitus; D, H, frontal view.

Anoplognathus flavipennis Boisduval, 1835

Anoplognathus flavipennis Boisduval, 1835: 176; **revised status**

Anoplognathus castaneipennis Laporte, 1840: 126; Burmeister 1844: 446 (synonymy)

Anoplognathus flavipennis quadrimaculatus Ohaus, 1898: 34; Carne 1957: 140 (synonymy)

Anoplognathus brunnipennis sensu auctorum nec Gyllenhal

Types. *Anoplognathus flavipennis* Boisduval, 1835: lectotype (present designation): ♂: “229 / 35. // flavipennis // *A. rugosus* / Kirby. / Nlle Hollande // ANOPLIGNATHUS / BRUNNIPENNIS / (GYLLENHAL) / Det:A.B.T.Smith 2001 // TYPE // MNHN / EC1440” (MNHN); paralectotypes (3): ♀: “229 / 35. // TYPE // MNHN / EC1441” (MNHN); ♀: “229 / 35. // *A. flavipennis* / Boisd. / Nlle Hollande // TYPE // MNHN / EC1442” (MNHN); ♀: “229 / 35. // TYPE // MNHN / EC1443” (MNHN).

Remarks. A lectotype is designated here for *A. flavipennis* to fix its identity (Fig. 2A–C). The lectotype of *Anoplognathus brunnipennis* (Fig. 1A–D) was not seen by Carne (1957) and he misinterpreted the species. Carne (1957) erroneously synonymized *A. flavipennis* and *A. flavipennis quadrimaculatus* with *A. brunnipennis*. *Anoplognathus*

flavipennis (Fig. 2A–P) is the valid name for this misidentified species, as it is the oldest available name. *Anoplognathus flavipennis* was considered a valid species until Carne's (1957) revision of the genus, for example by Ohaus (1898), and old specimens labelled *A. flavipennis* by W.S. MacLeay in MMS are correctly identified. The validity of the synonymization of *A. castaneipennis* and *A. flavipennis quadrimaculatus* (described as a colour variety of *A. flavipennis*) with *A. brunnipennis* auctorum nec Gyllenhal, as proposed by Burmeister (1844) and Carne (1957), was not examined in this work.

Anoplognathus flavipennis is a fairly common species from northwest Sydney to southern Queensland (AMS). This species is distinguished by the setose clypeus, setose dull pygidium, and short rounded mesoventral process (Reid & Smith 2016; Burleigh & Reid 2017).

***Anoplognathus olivieri* (Schönherr & Dalman 1817)**

Rutela olivieri Schönherr & Dalman, 1817 (in Schönherr 1817: 60)

Rutela lacunosa Thunberg, 1822: 311; **new synonym**

Anoplognathus impressus Boisduval, 1835: 173; Ohaus 1918: 171 (synonymy)

Anoplognathus duponti Boisduval, 1835: 174; Carne 1957: 105 (synonymy)

Types. *Rutela olivieri* Schönherr & Dalman, 1817: lectotype (present designation): ♀: “N. Holland / D. Hooker. // NHRS-JLKB / 000029804” (NHRS); *Rutela lacunosa* Thunberg, 1822: lectotype (present designation): ♀: “Upsala Univ. Zool. Mus. / Thunbergsaml. nr. 3137 / Rutela lacunosa / Jamaica. Swartz. TYP // LECTOTYPE / Rutela lacunosa / Thunberg, 1822 / des. Seidel + Reid 2019 // Anoplognathus / olivieri / (Schönherr + Dalman / 1817) / det. M. Seidel 2019 // WORLD / SCARAB. / DATABASE / WSD00344320” (UUZM).

Remarks. Lectotypes are hereby designated for *Rutela olivieri* (Fig. 3A–D) and *Rutela lacunosa* (Fig. 3E–H) to fix their identities. *Rutela olivieri* was described by Schönherr and Gyllenhal, not Dalman alone (Schönherr 1817: 61). Boisduval (1835), while transferring *R. olivieri* to *Anoplognathus*, misspelled the species epithet as “*olivieri*” eliding an “*i*”. This is an incorrect subsequent spelling but has been used by all later authors (for example, Burmeister 1844; Ohaus 1904; Carne 1957; Smith 2003). The International Commission on Zoological Nomenclature (1999) Article 33.3.1. states that “when an incorrect subsequent spelling is in prevailing usage and is attributed to the publication of the original spelling, the subsequent spelling and attribution are to be preserved and the spelling is deemed to be a correct original spelling”. Since *A. olivieri* (Schönherr & Dalman, 1817) is in prevailing usage and has been consistently attributed to the original publication it is deemed to be a correct original spelling.

Type material of *Anoplognathus olivieri* was not examined by Carne (1957) but his interpretation of the species was correct. *Rutela lacunosa* is conspecific with *Anoplognathus olivieri* and therefore placed in synonymy. The validity of the synonymization of *A. impressus* and *A. duponti* with *A. olivieri* as proposed by Ohaus (1918) and Carne (1957), respectively, was not examined in this work.

Anoplognathus olivieri occurs from Victoria to central Queensland and is a common species around Sydney (AMS). It is distinguished by laterally expanded female elytra, smooth mostly impunctate ventrites and shiny pygidium with apical tuft of setae (Reid & Smith 2016; Burleigh & Reid 2017).

***Anoplognathus porosus* (Dalman, 1817)**

Rutela porosa Dalman, 1817 (in Schönherr 1817: 63)

Anoplognathus inustus Kirby, 1819: 405; Burmeister 1844: 445 (synonymy)

Anoplognathus pectoralis Burmeister, 1844: 443; Carne 1957: 115 (synonymy)

Anoplognathus luridus Arrow, 1901: 396; Carne 1957: 115 (synonymy)

Types. *Rutela porosa* Dalman, 1817: lectotype (present designation): ♀: “Nov: Holland // NHRS-JLKB / 000029805” (NHRS).

Remarks. A lectotype is designated here for *Rutela porosus* (Fig. 3I–L) to fix the species identity. Type material of *Anoplognathus porosus* was not seen by Carne (1957) but he correctly interpreted the species. The validity of the synonymization of *A. inustus* with *A. porosus* by Burmeister (1844) as well as *A. pectoralis* and *A. luridus* with *A. porosus* by Carne (1957), was not examined in this work.

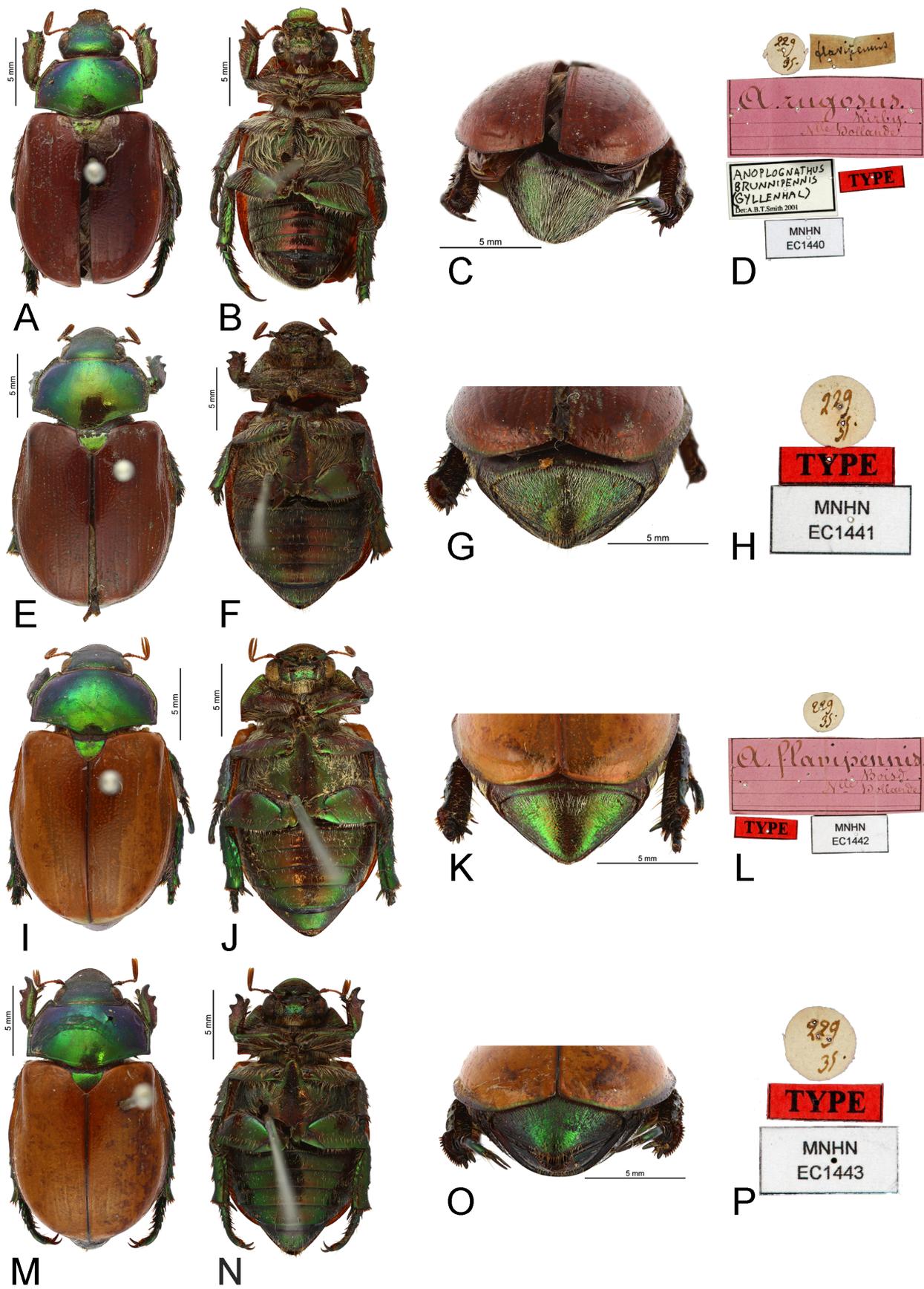


FIGURE 2. Lectotype male (A–D) and paralectotype females (E–P) of *Anoplognathus flavipennis* Boisduval, 1835 [photographs courtesy of MNHN]. A, E, I, M, Dorsal habitus; B, F, J, N, ventral habitus; C, G, K, O, caudal view; D, H, L, P, labels.

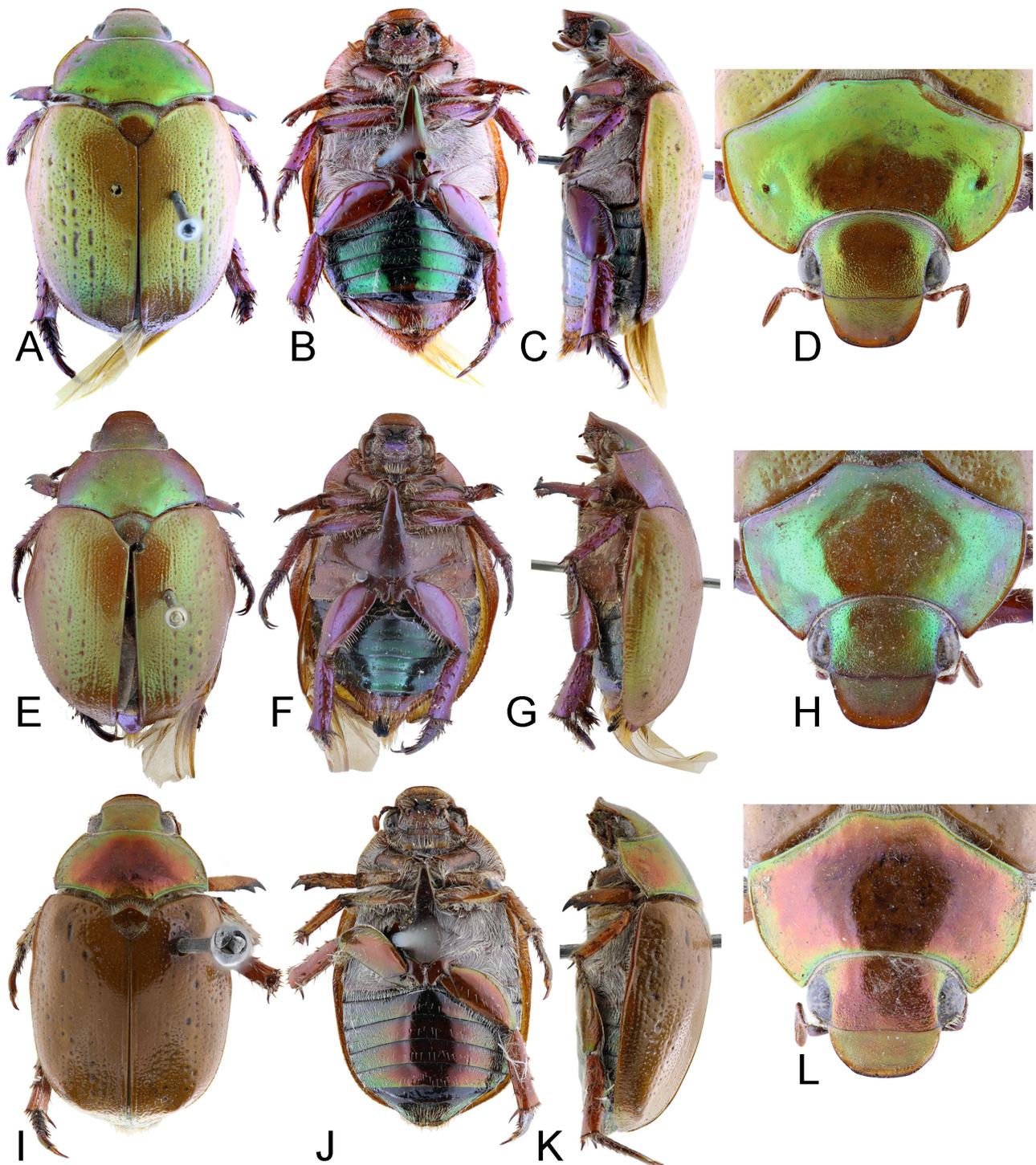


FIGURE 3. Lectotype females of *Rutela olivieri* Schönherr & Dalman, 1817 (A–D), *Rutela lacunosa* Thunberg, 1822 (E–H), and *Rutela porosus* Dalman, 1817 (I–L). A, E, I, Dorsal habitus; B, F, J, ventral habitus; C, G, K, lateral habitus; D, H, L, frontal view.

Anoplognathus porosus occurs from Victoria to northern Queensland and is a common species around Sydney (AMS). It is similar to *A. olivieri* but females lack the lateral elytral expansion and the pygidium is bronze-green, with a border of recumbent white setae (Reid & Smith 2016; Burleigh & Reid 2017).

Anoplognathus viridiaeneus (Donovan, 1805)

Melolontha viridiaenea Donovan, 1805: plate 1

Rutela caesarea Billberg, 1817 (in Schönherr 1817: 58); Burmeister 1844: 439 (synonymy)

Rutela latreillei Schönherr & Gyllenhal, 1817 (in Schönherr 1817: 59); Dejean 1833: 154 (synonymy)

Types. *Rutela latreillei* Schönherr & Gyllenhal, 1817: lectotype (present designation): ♀: “a // Uppsala Univ. Zool. Mus. / Gyllenhals saml. TYP nr. / 1447” (UUZM); paralectotypes (2): ♂: “Nov: Holland / Swartz. // NHRS-JLKB / 000027468” (NHRS); ♂: “Anoplognathus / Mc Leay / viridiaeneus / Donovan / Rutela latreillei / S[?war]tz / (Nov. Hollandia) // ♂ / NHRS-JLKB / 000027469” (NHRS).

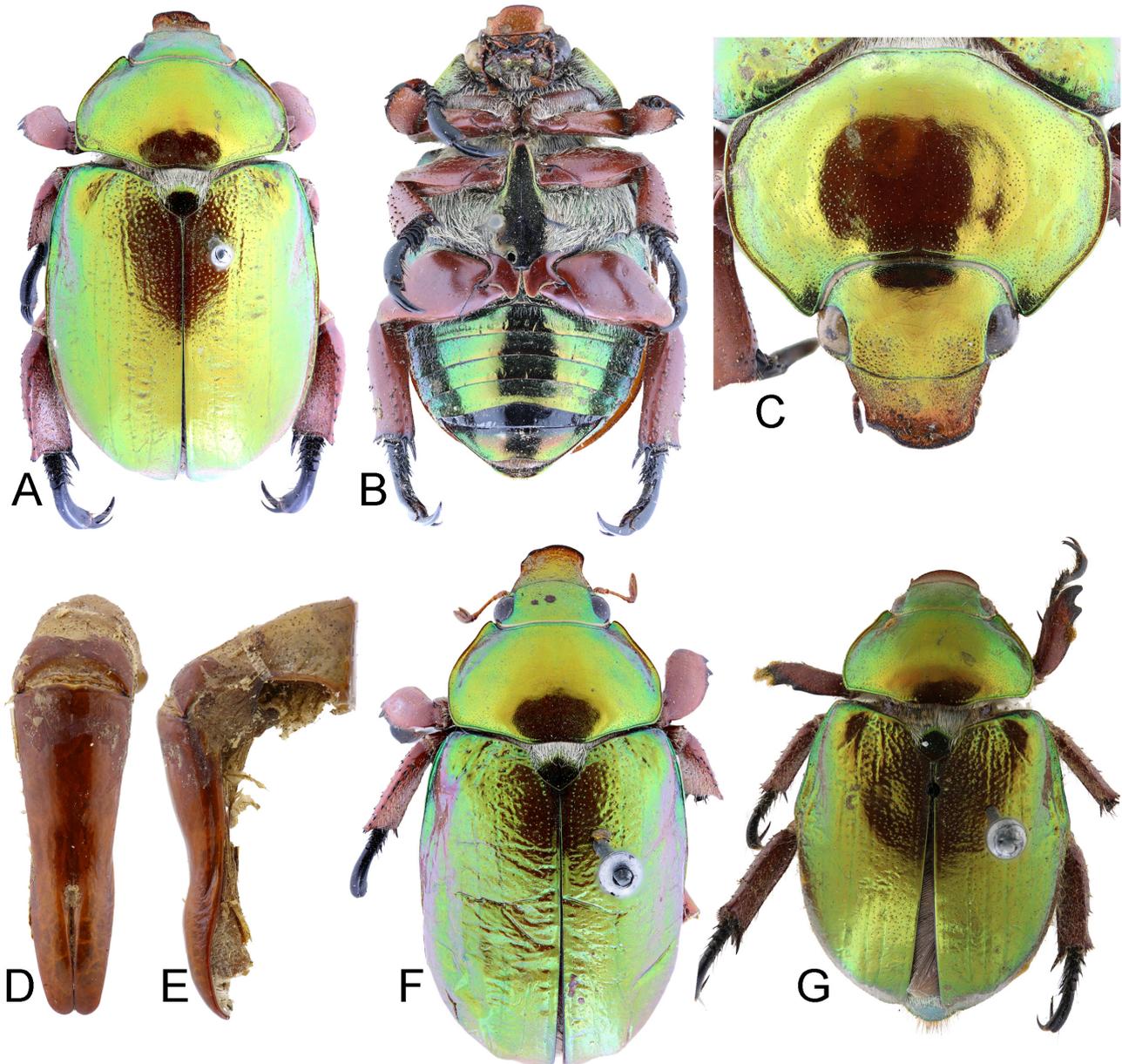


FIGURE 4. Male paralectotypes (A–F), and female lectotype (G) of *Rutela latreillei* Schönherr & Gyllenhal, 1817. A, F–G, Dorsal habitus; B, ventral habitus; C, frontal view; D, aedeagus, frontal view; E, aedeagus, lateral view.

Remarks. *Anoplognathus latreillei* was described by Schönherr and Gyllenhal, not Gyllenhal alone (Schönherr 1817: 60). Carne (1957) could not locate the type series of *R. latreillei* (Fig. 4A–G), which was deposited in the NHRS and UUZM. The two paralectotypes in Gyllenhal’s collection in the NHRS are pinned beneath a handwritten label saying “Caesarea. / Billb: [...]”, which we do not consider to be syntypes of Billberg’s species. Billberg’s early collection was destroyed by fire in 1822 (Horn & Kahle 1935), therefore it is almost certain that type material of

Rutela caesarea no longer exists. Gyllenhal probably recognized that his species was a synonym and relabelled his specimens, so we consider these two specimens to be his type material. The UUZM lectotype was clearly labelled as *Rutela latreillei* and we designate this as lectotype to fix the identity of the species. The synonymy of *A. latreillei* with *A. viridiaeneus* was first proposed by Dejean (1833), but with precedence given to the younger name.

Anoplognathus viridiaeneus occurs from central New South Wales to central Queensland, mostly near the coast. It was formerly common in the Sydney area but is now a relatively scarce species there (AMS). It is distinguished by its large size, entirely green reflections, and shiny pygidium with apical setal tuft (Reid & Smith 2016; Burleigh & Reid 2017).

***Anoplognathus viriditarsis* Leach, 1815**

Anoplognathus viriditarsis Leach, 1815: 44

Rutela analis Dalman, 1817 (in Schönherr 1817: 61); Dejean 1833: 154 (synonymy)

Anoplognathus reticulatus Boisduval, 1835: 169; Carne 1957: 102 (synonymy)

Anoplognathus impressifrons Boisduval, 1835: 170; Ohaus 1918: 172 (synonymy with *A. reticulatus*)

Anoplognathus viridicollis Macleay, 1873: 357; Carne 1957: 102 (synonymy)

Types. *Rutela analis* Dalman, 1817: lectotype (present designation): ♂: “♂ / N: Hollande / Hooker. // NHRS–JLKB / 000029803” (NHRS); paralectotype (1): ♀: “♀ / N: Hollande / Hooker. // NHRS–JLKB / 000029802” (NHRS).

Remarks. We designate a lectotype for *Rutela analis* to fix the identity of this species. Carne (1957) did not locate the type series of *R. analis* (Fig. 5A–J), which is deposited in NHRS. Our examination confirms the synonymy of *A. analis* and *A. viriditarsis* first proposed by Dejean (1833), although Dejean gave precedence to the younger name. Male and female syntypes of *A. viridicollis* in ANIC were examined by Carne (1957) and have been re-examined by us, confirming the synonymy of this name with *A. viriditarsis*. The validity of the synonymy of the two Boisduval species listed under *A. viriditarsis* in Carne (1957) was not examined in this work.

Anoplognathus viriditarsis occurs from Victoria to southeastern Queensland and is a common species around Sydney (AMS). It is distinguished from other species by the shiny pygidium and apical setal tuft, the shovel-shaped male clypeus, and the incomplete bands of setae on the ventrites (Reid & Smith 2016; Burleigh & Reid 2017).

Genus *Amblyterus* MacLeay, 1819

***Amblyterus cicatricosus* (Gyllenhal, 1817)**

Melolontha cicatricosa Gyllenhal, 1817 (in Schönherr 1817: 113)

Amblyterus geminatus MacLeay, 1819: 142; Blanchard 1851: 224 (synonymy)

Types. *Melolontha cicatricosa* Gyllenhal, 1817: lectotype (present designation): ♂: “N. Holland / D. Hooker // Typus // Melolontha / cicatricosa Gyll. // NHRS–JLKB / 000029815” (NHRS).

Remarks. A lectotype is designated here for *Melolontha cicatricosa* (Fig. 6A–F) to fix the species identity. Carne (1958) examined the lectotype in NHRS. The synonymy of *A. geminatus* with *A. cicatricosus* was first proposed by Blanchard (1851). MacLeay’s holotype of *A. geminatus* is in ANIC although it was not listed when all type material was removed from the Macleay Museum, Sydney University (Britton & Stanbury 1981). It was examined by Carne (1958) and re-examined by us and the synonymy is hereby confirmed.

Amblyterus cicatricosus occurs from central New South Wales to central Queensland and is a common species around Sydney (AMS). It is distinguished from congeners by its size, colour, leg structure, and large male maxillary palpi (Carne 1958).

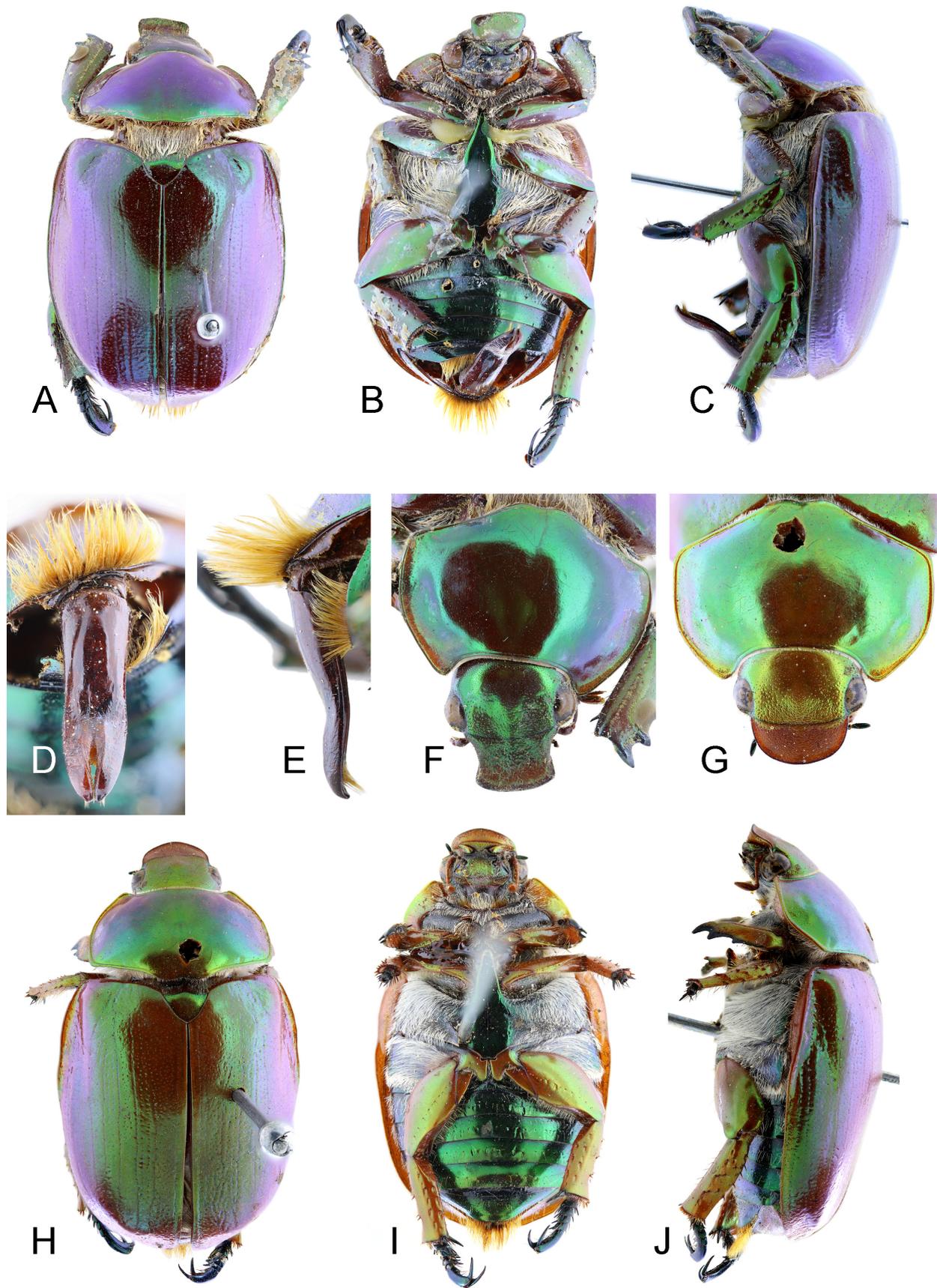


FIGURE 5. Male lectotype (A–F) and female paralectotype (G–J) of *Rutela analis* Dalman, 1817. A, H, Dorsal habitus; B, I, ventral habitus; C, J, lateral habitus; D, aedeagus, frontal view; E, aedeagus, lateral view; F, G, frontal view.

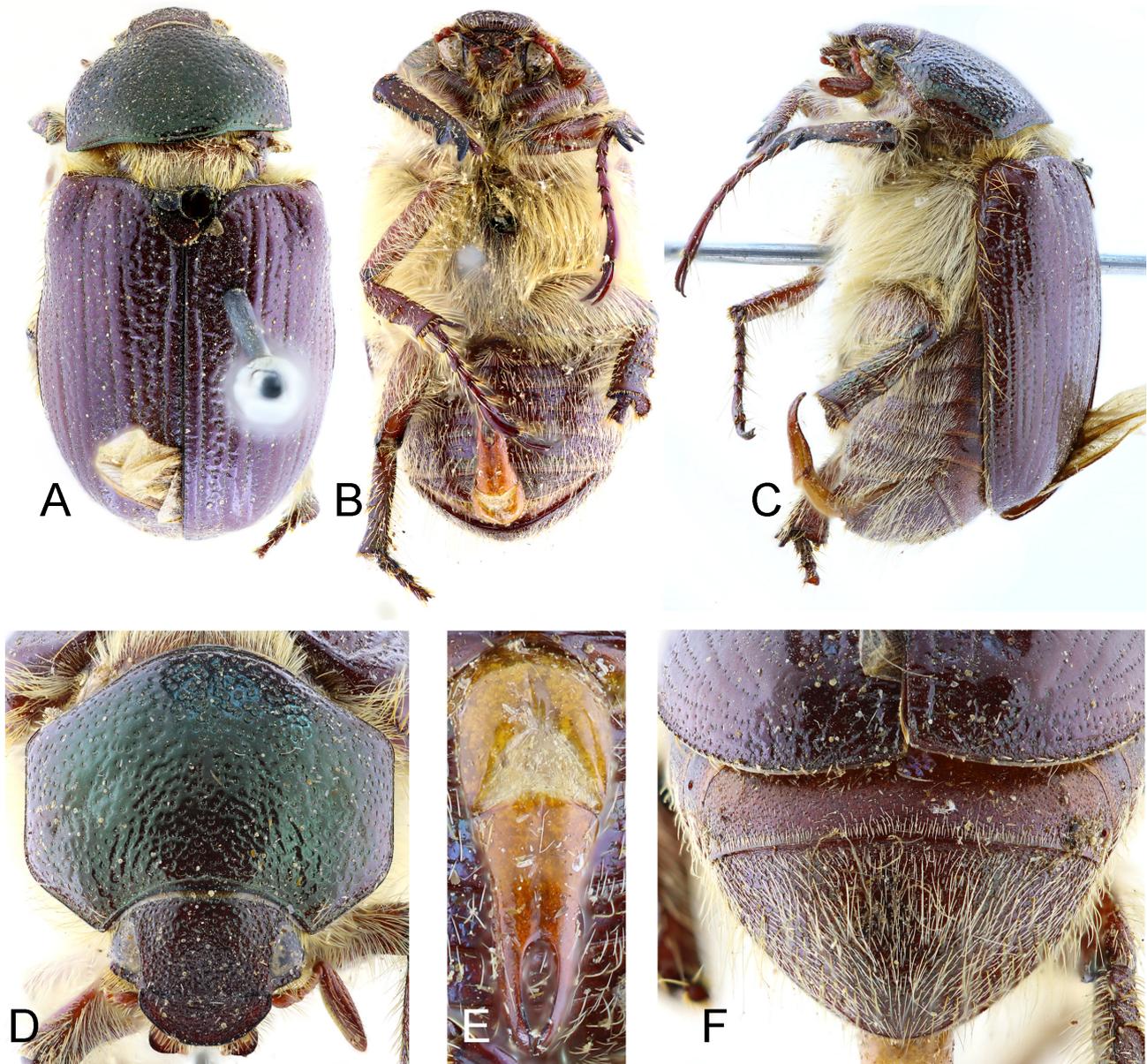


FIGURE 6. Lectotype male of *Melolontha cicatricosus* Gyllenhal, 1817. **A**, Dorsal habitus; **B**, ventral habitus; **C**, lateral habitus; **D**, frontal view; **E**, aedeagus, dorsal view; **F**, pygidium.

Genus *Repsimus* MacLeay, 1819

Repsimus manicatus (Swartz, 1817)

Rutela manicata Swartz, 1817 (in Schönherr 1817: 64)

Rutela bracteatus Drapiez, 1819: 135 Blanchard 1851: 224 (synonymy)

Anoplognathus brownii MacLeay, 1819: 144; Burmeister 1844: 450 (synonymy)

Anoplognathus dytiscoides MacLeay, 1819: 144; Dejean 1833: 155 (synonymy)

Rutela ruficollis Thunberg, 1822: 310; **new synonym**

Types. *Rutela manicata* Swartz, 1817: lectotype (present designation): ♀: “Anoplognathus / manicatus / Nova Holl: / Falderm. // Typus // NHRS-JLKB / 000029811 // Sch. macleayi Fischer / type probably in Moscow” (NHRS); paralectotype (1): ♀: “N. Holl. / Mack Leay // Typus // NHRS-JLKB / 000029811 // Rutela / manicata Swartz” (NHRS); *Rutela ruficollis* Thunberg, 1822: lectotype (present designation): ♀: “a // Uppsala Univ. Zool. Mus. /

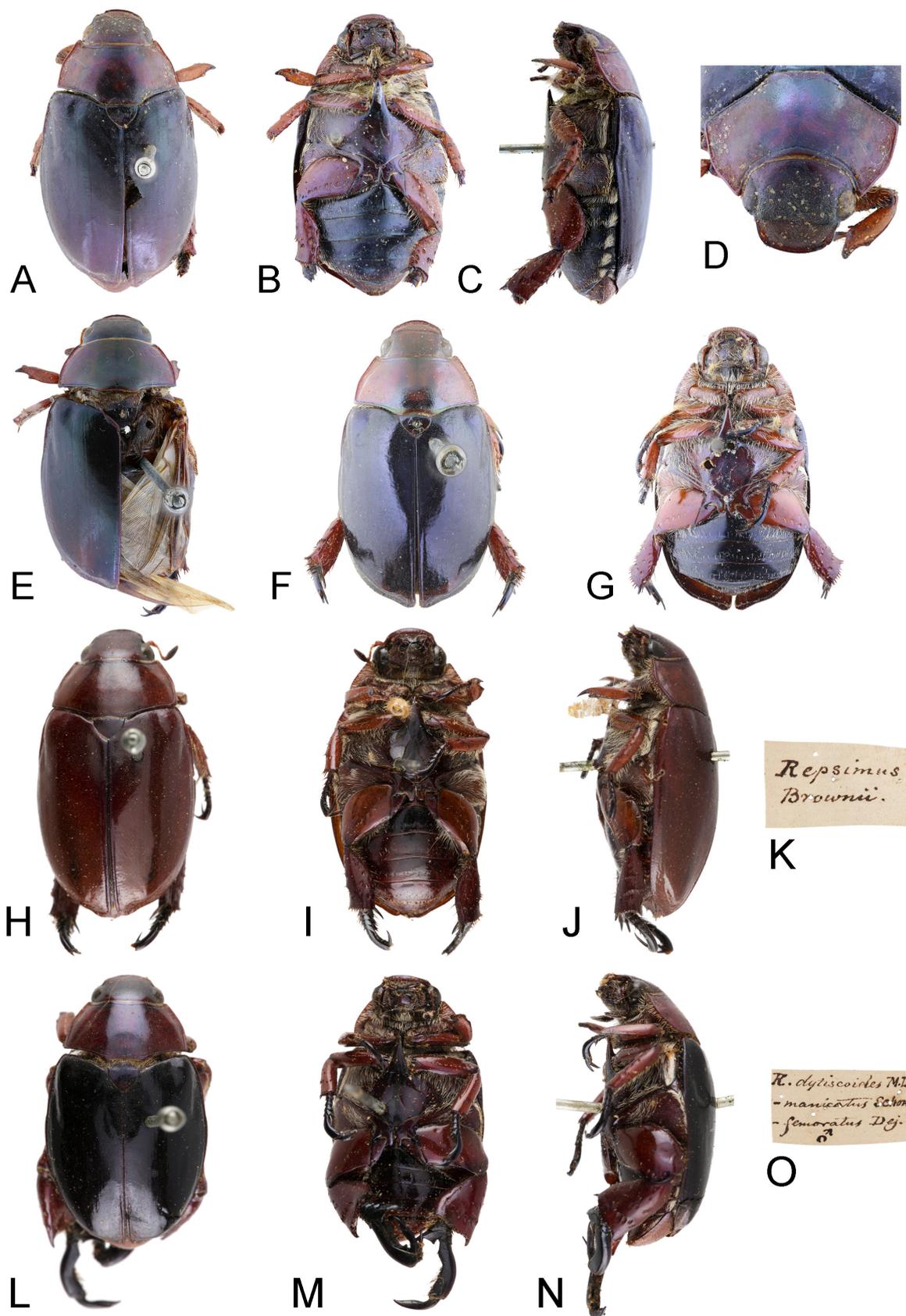


FIGURE 7. Male lectotype (A–D) and female paralectotype (E) of *Rutela manicata* Swartz, 1817, female lectotype of *Rutela ruficollis* Thunberg, 1822 (F–G), female lectotype of *Anoplognathus brownii* MacLeay, 1819 (H–K), and male lectotype of *Anoplognathus dytiscoides* MacLeay, 1819 (L–O). A, E–F, H, L, Dorsal habitus; B, G, I, M, ventral habitus; C, J, N, lateral habitus; D, frontal view. K, O, labels; Photographs H–O by Jude Philp.

Thunbergsaml. nr. 3898 / *Rutela ruficollis* / TYP” (UUZM); *Anoplognathus brownii* MacLeay, 1819: lectotype (present designation): ♀: “*Repsimus brownii*” [in WS MacLeay’s handwriting] (MMS); paralectotypes (3): 3♀: shared label with lectotype (MMS); *Repsimus dytiscoides* MacLeay, 1819: lectotype (present designation): ♂: “*Repsimus dytiscoides* M.L /—*manicatus* Schon /—*femoratus* Dej. / ♂” [in WS MacLeay’s handwriting] (MMS); paralectotype: (1): ♂: shared label with lectotype (MMS).

Remarks. We designate lectotypes for *Rutela ruficollis* (Fig. 7F–G), *Repsimus manicatus* (Fig. 7A–D), *Anoplognathus dytiscoides* (Fig. 7L–N), and *Anoplognathus brownii* (Fig. 7H–J) to fix the identities of these names.

Carne (1958) examined syntypes of *Repsimus manicatus* (Fig. 7A–E) in NHRS. *Rutela ruficollis* is conspecific with *R. manicatus* and therefore placed in synonymy. The types of MacLeay’s two species were recorded in the Macleay Museum, Sydney, by Carne: “type of *manicatus* in NRS, those of Macleay species in MACL” (Carne 1958: 180). In the 1970s all identified coleopteran type material was removed from the Macleay Museum (Sydney) and placed in ANIC (Canberra) (Britton & Stanbury 1981). Two syntypes of *A. brownii* were noted (Britton & Stanbury 1981: 250). However, it is evident from their labels that these specimens do not form part of the original type series as they were collected in the 1830s. They do not have a type status, so Carne’s decision was not based on type examination.

In MMS we found two sets of specimens associated with old labels written by William Sharp MacLeay (handwriting identified by Jude Philp, personal communication, May 2018), but without any indication of type status. There are four specimens (all females) associated with a label “*Repsimus brownii*” (Fig. 7K) and two specimens (both males) associated with the label “*R. dytiscoides*” (Fig. 7O). All six have the same short pin with a wrapped metal head. These appear to be the original pins used by Alexander MacLeay (Jude Philp, personal communication) and the specimens fit the original descriptions by his son, William Sharp MacLeay (1819). In the absence of any evidence to the contrary we believe that these two sets of specimens represent the type material of *A. brownii* and *A. dytiscoides*. We have selected the best-preserved specimens in each series as lectotypes (Fig. 7H–O). We suspect that Carne overlooked the type material of MacLeay’s species as he was meticulous in labelling specimens he examined and the MacLeay types noted above lack Carne’s labels. Our examination of the type series of *R. brownii* and *R. dytiscoides* confirms their synonymy with *A. manicatus*, as originally proposed by Burmeister (1844) and Dejean (1833), respectively. The validity of the synonymy of *R. bracteatus* with *R. manicatus* has not been examined for this work. The status of *Repsimus manicatus montanus* Lea, 1919 is not dealt with here.

Repsimus manicatus occurs from eastern Victoria to southeastern Queensland and is a common species around Sydney (AMS). It is distinguished by the red pronotum, almost glabrous ventrites, and greatly swollen male metatibiae.

Concluding remarks

It is notable that the 10 species described by four different Swedish naturalists were all published in a short space of time, 1815–1822. All 10 species are or were common in the Sydney area (Carne 1958; Reid & Smith 2016). We suspect therefore that this material came from the first settlement in Sydney. The suppliers of the Swedish material, as acknowledged in the labels and descriptions, were Hooker (four species, for Dalman and Gyllenhal), Swartz (one species, for Gyllenhal), Gröndal (one species, for Billberg), Falderman (one species, for Swartz), and MacLeay (one species, for Swartz). We are unable to find any biographical material for Hooker (note that the name is cited as “D. Hooker” but this means ‘domus’, that is ‘collection of’, rather than a personal initial). The other names are all European collectors, evidently exchanging specimens. MacLeay named *A. brownii* for Robert Brown who travelled widely in Australia from 1801–1805, mostly collecting plants (Chapman *et al.* 2001). Brown mostly visited areas outside the range of the Rutelinae considered here, but extensively explored the Sydney to Newcastle area in New South Wales, and briefly landed at what is now Melbourne, Victoria, and at central Queensland (*loc. cit.*). Therefore, his ruteline material is most likely from coastal and central New South Wales.

This review of the Anoplognathini type material of Gyllenhal, Swartz, Dalman, and Thunberg has resulted in taxonomic changes in the genus *Anoplognathus*. The identities of *Rutela lacunosa*, *Rutela chloropyga*, and *Rutela ruficollis* have been addressed for the first time since their description in 1822, resulting into three new junior synonyms: *Rutela lacunosa* Thunberg, 1822 **new synonym** = *Anoplognathus olivieri* (Gyllenhal, 1817); *Rutela chloropyga* Thunberg, 1822 **new synonym** = *Anoplognathus brunnipennis* (Gyllenhal, 1817); and *Rutela ruficol-*

lis Thunberg, 1822 **new synonym** = *Repsimus manicatus* (Swartz, 1817). The description of Thunberg's taxa so shortly after the same species had been described by Gyllenhal and Swartz, suggests that they might have had the same insect supplier. The review of the type of *Anoplognathus brunnipennis* revealed that this species is currently misinterpreted. Its identity is what is now accepted as *A. chloropyrus*. Therefore, *A. chloropyrus* is synonymized with *A. brunnipennis*. Since *A. brunnipennis* refers to another species, *A. flavipennis* Boisduval, 1835 is reinstated as the valid name for the species. Carne's (1957) revision of *Anoplognathus* lacked direct examinations of many types and was largely built on the interpretations of previous authors.

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