

Epilachnini (Coleoptera: Coccinellidae)—A Revision of the World Genera

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Abstract

Based on the recent revised generic classification of the tribe Epilachnini (Szawaryn et al. 2015), all 27 genera are re-described, diagnosed, illustrated, and included in an identification key. The following nomenclatural changes are made: *Epilachna* (*Hypsa*) Mulsant 1850, *Epilachna* (*Cleta*) Mulsant 1850, *Solanophila* Weise 1898, *Epilachna* (*Aparodontata*) Wang and Cao 1993, and *Epilachna* (*Uniparodontata*) Wang and Cao 1993 are removed from synonymy of *Epilachna* Chervolat 1837. The subgenus *Cleta* of *Epilachna* is raised to the genus level, as *Cleta* Mulsant 1850 stat. nov.; the subgenus *Uniparodontata* of *Epilachna* is raised to the genus level, as *Uniparodontata* Wang and Cao 1993 stat. nov. *Chazeauiana* Tomaszewska and Szawaryn 2015 (type species, *Epilachna sahlbergi* Mulsant 1850), and *Epilachna* (*Hypsa*) Mulsant 1850 (type species, *Epilachna nigrolimbata* Thomson 1875) are synonymized here under the name *Cleta* Mulsant 1850 (type species, *Epilachna eckloni* Mulsant 1850)—new synonyms; *Fuerschia* Tomaszewska and Szawaryn 2015 (type species, *Coccinella canina* Fabricius 1781) is synonymized with *Solanophila* Weise 1898 (type species, *Epilachna gibbosa* Crotch 1874)—new synonym; *Ryszardia* Tomaszewska and Szawaryn 2015 (type species, *Epilachna decipiens* Crotch 1874) and *Epilachna* (*Aparodontata*) Wang and Cao, 1993 (type species, *Epilachna yongshanensis* Cao and Xiao 1984) are synonymized under the name *Uniparodontata* Wang and Cao 1993 (type species, *Epilachna paramagna* Pang and Mao 1979)—new synonyms. *Henosepilachna* (*Elateria*) Fürsch 1964 (type species: *Coccinella elaterii* Rossi 1794) is removed from synonyms of *Henosepilachna* Li 1961 [type species, *Coccinella sparsa* Herbst 1786 (= *Coccinella vigintioctopunctata* Fabricius 1775)] and is synonymized here with *Chnootriba* Chevrolat 1837 (type species: *Coccinella similis* Thunberg 1781)—new synonym. *Coccinella flavofasciata* Laporte 1840, *Epilachna aequatorialis* Gordon 1975, *E. bizonata* Crotch 1874, *E. convergens* Crotch 1874, *E. cruciata* Mulsant 1850, *E. dubia* Crotch 1874, *E. monovittata* Gordon 1975, *E. orthostriata* Gordon 1975, *E. paracuta* Gordon 1975, *E. patricia* Mulsant 1850, *E. satipensis* Gordon 1975, and *E. univittata* Crotch 1874 are transferred to *Toxotoma* Weise 1900 (comb. nov.); *Afissa chapini* Dieke 1947, *A. complicata* Dieke 1947, *A. convexa* Dieke 1947, *A. magna* Dieke 1947, *A. militaris* Dieke 1947, *A. quadricollis* Dieke 1947, *A. subacuta* Dieke 1947, *A. szechuana* Dieke 1947, *Epilachna boymi* Jadwiszczak and Węgrzynowicz 2003, *E. crepida* Pang and Ślipiński 2012, *E. decipiens* Crotch 1874, *E. dorotae* Bielawski 1979, *E. hamulifera* Pang and Ślipiński 2012, *E. malleforma* Peng, Pang and Ren 2002, *E. siphodenticulata* Hoàng 1983, *E. angusta* Li 1961, *E. bifibra* Li 1961, *E. chingjing* Yu and Wang 1999, *E. circumdata* Hoàng 1978, *E. circummaculata* Pang and Mao 1977, *E. clematicola* Cao and Xiao 1984, *E. exornata* Bielawski 1965, *E. folifera* Pang and Mao 1979, *E. fugongensis* Cao and Xiao 1984, *E. glochisifoliata* Pang and Mao 1979, *E. gressiti* Li 1961, *E. lata* Li 1961, *E. madanensis* Zeng 2002, *E. media* Li 1961, *E. mobiliteratiae* Li 1961, *E. yongshanensis* Cao and Xiao 1984, *Solanophila acuta* Weise 1900, and *S. saginata* Weise 1902 are transferred to *Uniparodontata* Wang and Cao 1993 (comb. nov.); *Coccinella canina* Fabricius 1781, *Epilachna dregei* Mulsant 1850, *E. infirma* Mulsant 1850, *E. murrayi* Crotch 1874 and *E. paykullii* Mulsant 1850 are transferred to *Solanophila* Weise 1898 (comb. nov.); *Afissula antennata* Bielawski 1967, *A. rana* Kapur 1958, *A. uniformis* Pang and Mao 1979, *Epilachna ampliata* Pang and Mao 1979, *E. flavimarginalis* Hoàng 1978, *E. max* Pang and Ślipiński 2012, *E. parvula* Crotch, *E. plicata* Weise 1889, and *E. sanscrita* Crotch 1874 are transferred to *Afissa* Dieke 1947 (comb. nov.); *Epilachna papuensis* Crotch 1874 and *Subafissa brittoni* Bielawski 1963 are transferred to *Henosepilachna* Li 1961 (comb. nov.); *Epilachna admirabilis* Crotch 1874, *E. alternans* Mulsant 1850, *E. glochinosa* Pang and Mao 1979, *E. hopeiana* Miyatake 1985, *E. insignis* Gorham 1892, *E. macularis* Mulsant 1850, *E. parainsignis* Pang and Mao 1979, and *Solanophila maxima* Weise 1898 are transferred to

Diekeana Tomaszewska and Szawaryn 2015 (comb. nov.); *Epilachna fulvohirta* Weise 1895, *E. nigrolimbata* Thomson 1875, *Henosepilachna griveaudi* Chazeau 1975, *H. vadoni* Chazeau 1976, *Solanophila consignata* Weise 1909, *S. coquereli* Sicard 1907, and *S. gyldenstolpei* Weise 1924 are transferred to *Cleta* Mulsant 1850 (comb. nov.); *Afidenta janczyki* Fürsch 1986, *Epilachna capicola* Mulsant 1850, *E. godarti* Mulsant 1850, *E. scitula* Weise 1898, *Henosepilachna acervata* Chazeau 1975, and *Solanophila blaesa* Weise 1905 are transferred to *Afidentula* Kapur 1958 (com. nov.); *Coccinella elaterii* Rossi 1794, *C. hirta* Thunberg 1781, *C. pavonia* Olivier 1808, *Epilachna annulata* Kolbe 1897, *E. biplagiata* Kolbe 1897, *E. cinerascens* Weise 1907, *E. connectens* Weise 1912, *E. erichi* Weise, 1897, *E. ocellata* Bertoloni, 1849, *E. pauli* Weise, 1897, *E. tetracycla* Gerstaecker, 1871, *E. umbratilis* Weise 1909, *E. vulgaris* Weise 1901, *Henosepilachna bigemmata* Fürsch 1991, *Solanophila guttifer* Weise 1899, *S. hova* Weise 1905, and *S. kaffaensis* Weise 1906 are transferred to *Chnootriba* Chevrolat 1837 (com. nov.); *Coccinella guttatopustulata* Fabricius 1775, *Epilachna aruensis* Crotch 1874, *E. biroi* Weise 1902, *E. buqueti* Montrouzier 1861, *E. fulvimana* Weise 1903, *E. immaculata* Bielawski 1963, *E. karapensis* Bielawski 1963, *E. orrori* Bielawski 1963, *E. samuelsoni* Jadwiszczak 1991, and *E. slipinskii* Jadwiszczak 1987 are transferred to *Papuaepilachna* Tomaszewska and Szawaryn, 2013 (comb. nov.). The history of classification, the known aspects of the biology and distributional data of the tribe are summarized.

Key words: Coccinelloidea, Epilachnini, world genera, review

Ladybird beetles or family Coccinellidae contains about 6,000 species placed in 360 genera. It is generally accepted as a monophyletic group and has been traditionally classified in the superfamily Cucujoidea (Coleoptera, Polyphaga) and placed in the Cerylonid Series (CS), a derived clade formed by Cerylonidae and eight other families of cucujoid beetles (Crowson 1955, Robertson et al. 2008, Lord et al. 2010, Bocak et al. 2014). However, the most recent molecular research by Robertson et al. (2015) revealed the Cerylonid Series as the sister group to the remaining Cucujiformia, not allied with any of the existing Cucujiformia superfamilies including the remaining Cucujoidea. For these families, Robertson et al. (2015) established a new superfamily Coccinelloidea. Previous studies (Tomaszewska 2000, 2005; Hunt et al. 2007, Robertson et al. 2008, Bocak et al. 2014) indicated Corylophidae, Alexiidae or Endomychidae as sister groups to Coccinellidae. The study of Robertson et al. (2015) revealed sister relationships of Eupsillobidae (former Eupsilobiinae within Endomychidae) and Coccinellidae. All of these families are strictly fungivorous, suggesting the origin of a predatory behavior in the ancestor of Coccinellidae as a critical innovation and the key to their evolutionary success.

Coccinellidae exhibits in fact a broad trophic diversity that ranges from specialized predation on aphids, whiteflies, and other invertebrates, to fungivory, pollenophagy, and to strict herbivory. Chapuis (1876) used food preferences as a base for his classification of ladybirds and divided Coccinellidae into two groups: aphidophagous and phytophagous.

Phylogeny and the Recent Classification of the Family Coccinellidae

Most of the standard classifications of Coccinellidae (Gordon 1975, Kovár 1996, Vandenberg 2002) have recognized six or seven subfamilies (Coccinellinae, Coccidulinae, Scymninae, Chilocorinae, Epilachninae, Sticholotidinae, and, sometimes, Ortaliinae) and numerous tribes within each subfamily. The foundation of this system was developed by Sasaji (1968, 1971) through a detailed comparative morphological research on adults and larvae. His classification was very innovative at his time, however, it was geographically limited, based on very small number of taxa from the Palaearctic Region, mostly Japan. Other authors (H. Fürsch, R. Pope, A.P. Kapur, R. Gordon, D. Hoang, and I. Kovár) followed and modified Sasaji's system to suit faunas of their regional interests.

Kovár (1996) presented a major modification of the Sasaji's classification on a global scale, incorporating new research and many novel ideas about potential relationships between subfamilies and tribes. He recognized seven subfamilies and 38 tribes, showing phytophagous Epilachninae as a sister group to Coccinellinae derived from the same branch with Ortaliinae at the base of Coccinellidae phylogeny.

The subfamily classification proposed by Sasaji (1968) and Kovár (1996) was found to be largely artificial and phylogenetically unacceptable by Ślipiński (2007) who demonstrated that subfamilies Chilocorinae, Sticholotidinae, Scymninae, and Coccidulinae were polyphyletic assemblages and he argued the basal split of Coccinellidae into two clades (subfamilies) Microweiseinae and Coccinellinae with all the remaining coccinellid groups.

Four subsequent papers on molecular phylogeny of the family Coccinellidae (Giorgi et al. 2009, Aruggoda et al. 2010, Magro et al. 2010, Seago et al. 2011) confirmed monophyly of the family and supported the basal split advocated by Ślipiński (2007).

The publication by Nedvěd and Kovár (2012) contains somewhat "modernized" classification of Kovár (1996) in part incorporating elements of recently published molecular and morphological research. They proposed nine subfamilies (adding Exoplectrinae and Microweiseinae) and 42 tribes but without further discussion.

The research of Robertson et al. (2015) supports a division of Coccinellidae in two subfamilies.

Taxonomy and Classification of Epilachnini

Based on morphology (Ślipiński 2007) and initial molecular analyses by Giorgi et al. (2009), Ślipiński and Tomaszewska (2010) and Seago et al. (2011) reduced taxonomic rank of the subfamily Epilachninae to a tribal level within broadly defined Coccinellinae.

The classification of Epilachnini began with the first system of the family Coccinellidae proposed by Mulsant (1846), which he named "Securipalpes". In his world monograph (Mulsant 1850), he established system for all genera of Coccinellidae. Mulsant placed Epilachnini (Epilachniens) in Trichosomides, one of two his major divisions of the family. Prior to Mulsant's monograph only scattered species descriptions had appeared. Mulsant treated all known species to date as *Epilachna* Chevrolat in Dejean 1837, however he gave descriptions of all species and grouped them, establishing the subgenera *Cleta*, *Dira*, *Hypsa*, and *Mada*.

Subsequently from the middle of the 19th to the middle of the 20th century, E. Mulsant, G.R. Crotch, J. Weise, L. Mader, A. Sicard, and R. Korschefsky described many new species of this group based mainly on the size, color, and shape, and distribution of contrasting maculae on the elytra. These authors established about 10 small genera, leaving most of Epilachninae species in the genus *Epilachna*. More recently, attempts to review this group were made by Dieke (1947), Bielawski (1963), Gordon (1975), and Fürsch (1991). However, they worked only on regional faunas: Asia and Australia, eastern Asia, both Americas and Africa, respectively and achieved rather limited results. To improve clarity of systematics of this group, Li in Li and Cook (1961) established Asian-African genus *Henosepilachna*, as distinctly separated from *Epilachna*. Some authors have however questioned a validity of this genus and have synonymized *Henosepilachna* with *Epilachna* (Richards 1983, Ślipiński 2007).

In fact, history of nomenclature of Epilachnini is very complicated. Szawaryn (2011) summarized confusion in interpretation of the type species of the type genus of the subfamily, *Epilachna* lasting more than a century, which resulted in establishing several new genera and then synonymy of most of them. Szawaryn (2011) examined type series of *E. borealis* and supported the interpretation of *Epilachna* by Li and Cook (1961) recognizing *Henosepilachna* as a valid genus of Epilachnini. It became clear, however, that the taxonomic and phylogenetic studies on a global scale were needed to determine if both genera were monophyletic.

Historically, Epilachninae as subfamily was divided in four tribes: Epilachnini, Cynegetini, Epivertini, and Eremochilini (Gordon and Vandenberg 1987, Jadwiszczak and Węgrzynowicz 2003). Epivertini Pang and Mao included monotypic *Epiverta* Dieke and Eremochilini Gordon and Vandenberg contained *Eremochilus* Weise with three species. The tribe Cynegetini Thomson (=Madaini Gordon) included ten genera, containing from 2 to 45 species, while the tribe Epilachnini included remaining 11 genera with most species diversity of the subfamily.

Epilachnini with over 1000 species, contains nearly 20% of species of Coccinellidae divided until recently in 25 genera (Jadwiszczak and Węgrzynowicz 2003, Szawaryn and Tomaszewska 2013). Most of the genera consisted of few species only; three of them were monotypic (*Epiverta* Dieke, *Macrolasia* Weise, *Pseudodira* Gordon), further 20 genera included from 2 to 43 species; and the remaining species were split between *Henosepilachna* with 250 species and *Epilachna* with 580 species.

Despite of the economic importance of Epilachnini, the group was poorly understood taxonomically and contained until recently many generic taxa of questionable taxonomic status. Most modern classification of the subfamily was based on taxa occurring in the temperate zones of the world, which had a very limited use to much more diverse but hardly known fauna of this subfamily in the tropical and subtropical zones.

Szawaryn et al. (2015) in their molecular and morphology based research made the first attempt to test monophyly of currently recognized genera of phytophagous ladybird beetles. They (Szawaryn et al. 2015) reconstructed phylogeny of Epilachnini confirming its monophyly and proposed a modern classification of this tribe. Only 14 of the 25 included genera were recovered in their research as monophyletic. *Afidenta* Dieke, *Afidentula* Kapur, *Afissula* Kapur, *Chnootriba* Chevrolat, *Epilachna* Chevrolat, *Henosepilachna* Li, *Lalokia* Szawaryn and Tomaszewska 2013, *Mada* Mulsant, *Papuaepilachna* Szawaryn and Tomaszewska 2013, *Subafissa* Bielawski and *Toxotoma* Weise, were shown to be poly- or paraphyletic and were redefined. Two largest genera of the tribe, *Epilachna* and *Henosepilachna* split into multiple monophyletic

clades and they were described as new genera: *Chazeauiana* Tomaszewska and Szawaryn in Szawaryn et al. 2015, (with *Epilachna sahlbergi* Mulsant 1850 as the type species); *Diekeana* Tomaszewska and Szawaryn in Szawaryn et al. 2015, (with *Epilachna alternans* Mulsant 1850 as the type species); *Fuerschia* Tomaszewska and Szawaryn in Szawaryn et al. 2015, (with *Coccinella canina* Fabricius 1781 as the type species) and *Ryszardia* Tomaszewska and Szawaryn in Szawaryn et al. 2015, (with *Epilachna decipiens* Crotch 1874 as the type species). Moreover, *Afissula* Kapur 1958 was synonymized with *Afissa* Dieke 1947, *Subafissa* Bielawski 1963 was synonymized with *Henosepilachna* Li in Li and Cook 1961, and *Lalokia* Szawaryn and Tomaszewska (2013) was synonymized with *Papuaepilachna* Szawaryn and Tomaszewska (2013). As a result of that study, 27 genera of the tribe have been recognized.

As a result of a long and very complicated history of nomenclature of Epilachnini and especially of *Epilachna*, Szawaryn et al. (2015) have not avoided nomenclatural mistakes. Three of four monophyletic groups formed by species of former *Epilachna*, received unnecessarily new names: *Chazeauiana*, *Fuerschia*, and *Ryszardia*.

Epilachna is now restricted to the New World species, therefore all (even old and forgotten) synonyms at genus and subgenus level based on the type species distributed in Old World, have to be removed from that synonymy and considered as valid names.

Consequently, *Epilachna* (*Hypsa*) Mulsant 1850 (type species, *Epilachna nigrolimbata* Thomson 1875), *Epilachna* (*Cleta*) Mulsant 1850 (type species, *Epilachna eckloni* Mulsant 1850), *Solanophila* Weise 1898 (type species, *Epilachna gibbosa* Crotch 1874) *Epilachna* (*Aparodentata*) Wang and Cao 1993 (type species, *Epilachna yongshanensis*; Cao and Xiao 1984) and *Epilachna* (*Uniparodentata*) Wang and Cao 1993 (type species, *Epilachna paramagna* Pang and Mao 1979) have been removed from synonymy of *Epilachna* Chevrolat 1837. Then based on thorough examination of the literature (Mader 1941; Fürsch 1963, 1985, 1987, 1991; Wang and Cao 1993) and the material, the following new synonyms are proposed here: *Cleta* Mulsant 1850 (= *Epilachna* (*Hypsa*) Mulsant 1850; = *Chazeauiana* Tomaszewska and Szawaryn 2015); *Solanophila* Weise 1898 (= *Fuerschia* Tomaszewska and Szawaryn 2015); *Uniparodentata* Wang and Cao 1993 (= *Epilachna* (*Aparodentata*) Wang and Cao 1993; = *Ryszardia* Tomaszewska and Szawaryn 2015).

Characteristics of the Tribe

Epilachnini is a primarily herbivorous group, well defined based on morphological characters of all developmental stages.

In adults, the mandibles lack mola and are provided with more than two apical teeth, the mentum is trapezoidal and widest at its base. Moreover, pubescent body and herbivorous habit significantly differentiate Epilachnini from other, mainly predaceous ladybirds.

Eggs of Epilachnini species are oblong, usually yellow in color. They differ from the eggs of other Coccinellidae by having distinct microsculpture on the surface of chorion.

Larvae of Epilachnini are easily distinguishable morphologically from other Coccinellidae by having dorsal and lateral surfaces of the body covered with branched processes, head with epicranial stem, frontal arms V- or U-shaped, frontoclypeal suture sometimes present, and mandibles multidentate apically and without mola (Ślipiński and Tomaszewska 2010).

Biology

Both, the larvae and the adult beetles of Epilachnini, feed on the surface of host plants, feeding on leaf tissue. In contrast to other

phytophagous beetles, for instance Chrysomelidae, Epilachnini do not swallow pieces of leaf fragments, but only scrape the soft tissue, masticate it and suck the juices (Howard 1941). The larvae of Epilachnini usually feed on the underside of the leaves of host plants, whereas the adult beetles feed on the upper surface.

Traditionally, it has been considered that Epilachnini mainly feed on plants belonging to the families Solanaceae and Cucurbitaceae. However, this applies mainly to the economically important species commonly encountered on crops such as *Epilachna varivestis* Mulsant or *Henosepilachna vigintioctopunctata* (Fabricius). Although still little is known about the host plants of this group of beetles, several recent papers expand our knowledge in this field (Park and Yoon 1991, Bayene et al. 2007, Zhang and Ou 2010), listing families Poaceae, Urticaceae, Convolvulaceae, and Fabaceae, and even Aristolochiaceae or Caryophyllaceae.

The eggs are deposited in clusters of 15–50, whereas in most other ladybirds they are deposited individually. Females lay eggs on the underside of the leaves of host plants. A single female lays hundreds of eggs in several clusters (Richards and Filewood 1988, Hossain et al. 2009). Incubation of eggs lasts from 4 (*Henosepilachna vigintioctopunctata*) to 14 days (*Epilachna varivestis*) (Richards and Filewood 1988, Hossain et al. 2009). The larval development in Epilachnini takes four instars, as in all Coccinellidae. The duration of the stages depends on the temperature, humidity and the host plant (Hossain et al. 2009, Akadeh and Shishebor 2011). Moreover, also a structure of the leaf surface of host plants impacts on the development of larvae. For example, the first-instar larvae of *Epilachna varivestis* grow fastest on soybean plants with hairy leaves, while the third instar larvae grow fastest on the smooth leaves (Gannon and Bach 1996). Depending on the species, larval development lasts from 2 to 5 weeks. After this period, the larva pupates on the lower surface of a leaf of the host plant. Pupa remains in the molt of the final instar larval stage. An adult insect emerges from the pupa after about 1 week.

From the economic point of view, Epilachnini are among the most serious crop pests within beetles, causing significant damage to the agriculture around the world, similar to other groups of phytophagous beetles, such as Colorado beetles (Chrysomelidae) and weevils (Curculionidae). For example, *Henosepilachna chrysomelina* (Fabricius) causes a loss in crops of plants of the family Cucurbitace (melon, cucumber, and pumpkin) in Central Asia and also in Southern Europe. *H. vigintioctopunctata* (Fabricius) is known throughout the eastern parts of Asia and Australia and is a very serious pest of plants of the family Solanaceae (potato, tobacco, tomato, and aubergine). *Chnootriba similis* (Thunberg) is one of the most serious pests feeding on the crops of sorghum (Poaceae), in the southern regions of Africa. In turn, growing beans and peas (Fabaceae) in both Americas are threatened by *Epilachna varivestis* (Mulsant).

Distribution

Species of Epilachnini are distributed mainly in tropical and subtropical regions of the world with only few representatives in temperate zones (Gordon 1975). Neotropical fauna includes about 350, African about 400 and Asian approximately 300 species. Most species occur at the intersection of tropical forest ecosystems and mountain regions such as the Andes, the Himalayas or the region of the Great Rift Valley (Gordon 1975, Fürsch 1991). Among the world islands, only Madagascar (about 90 species) and New Guinea (about 40 species) have large number of endemic species of Epilachnini.

Objectives of the Current Project

Based on the phylogenetic study resulted from Szawaryn et al. (2015), the review of the currently recognized genera of Epilachnini is presented here based on extensive study of type and nontype material.

Materials and Methods

This study is based on approximately 6,000 adult specimens of nearly 250 species of all Epilachnini genera, examined during past 4 years. Species were examined, including available types. The studied material came from the following institutions:

- ANIC—Australian National Insect Collection, CSIRO, Canberra, Australia;
- BPBM—Bernice P. Bishop, Museum, Honolulu, USA;
- SYSBM—Museum of Biology, Sun Yat-Sen University, Guangzhou, China;
- CUMZ—University Museum of Zoology, Cambridge, United Kingdom;
- DBET—Department of Biodiversity and Evolutionary Taxonomy, Wrocław University, Wrocław, Poland;
- HFC—Helmut Fürsch Collection;
- HNHM—Hungarian Natural History Museum, Budapest, Hungary;
- IBUNA—Instituto de Biología, Universidad Nacional Autónoma de México, México;
- ISNB—Instytut Royal des Science Naturelles de Belgique, Brussels, Belgium;
- JEBC—Juan Enrique Barriga Tuñón Collection, Curicó, Chile;
- MIZ—Muzeum i Instytut Zoologii PAN, Warszawa, Poland;
- MLPA—Universidad Nacional de La Plata, Museo de la Plata, La Plata, Argentina;
- MNHN—Muséum National d'Histoire Naturelle, Paris, France;
- MRAC—Musée Royal de l'Afrique Centrale, Tervuren, Belgium;
- NHM—The Natural History Museum, London, United Kingdom;
- NHMO—University of Oslo, Zoological Museum, Oslo, Norway;
- NMB—Museum für Naturkunde, Berlin, Germany;
- OXUM—Oxford University Museum, Oxford, United Kingdom;
- SDEI—Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany;
- TMNH—Transvaal Museum of Natural History, Pretoria, South Africa;
- USNM—United States National Museum of Natural History, Washington D.C., USA;
- UZM—Uppsala Universitet, Museum of Evolution, Uppsala, Sweden;
- ZMAS—Zoological Museum of Russian Academy of Sciences, Petersburg, Russia;
- ZMUM—Zoological Museum of Lomonosov University, Moscow, Russia;
- ZMUC—University of Copenhagen, Zoological Museum, Copenhagen, Denmark;
- ZSMC—Zoologische Sammlung des Bayerischen Staates, München, Germany.

For detailed examination of morphological characters, at least one male and one female of each species represented by several specimens were completely cleared in 10% cold potassium hydroxide, disarticulated, and placed in glycerine slides for further study. In case species was represented by few specimens only, at least male and female genitalia were dissected and studied on slides. The

structural illustrations were made from slide preparations using a camera lucida attached to an Olympus dissecting microscope SZH 10 (www.olympus-global.com) or to a Zeiss Amplitiv microscope (smaller structures) (www.microscopy-uk.org.uk).

Habitus photographs were produced using a digital camera mounted on a Leica microscope (www.leica-microsystems.com) and subsequently enhanced using Auto-Montage software (Synchroscopy, www.synchroscopy.com) using a digital camera and enhanced using Automontage software, and the SEM photographs were made using HITACHI S-3400N microscope (www.hitachi.com), in the Electron Microscopy Laboratory at the MIZ.

The beetle morphology follows Lawrence et al. (2011) including use of Roman numerals for the body segments; specific terminology used in Coccinellidae follows Ślipiński (2007) and Ślipiński and Tomaszewska (2010).

Re-descriptions of the genera are arranged in the text according to their appearance in the key. In taxonomy section, the “species included” listed below each generic description, mean also species examined during our study. Proper taxonomic placement of the remaining (unstudied here) species, classified hitherto in each particular genus is left for further research. The type species of each genus is marked with asterisk (*).

Taxonomy

Epilachnini Mulsant 1846

Epilachniens Mulsant 1846: 190. Type genus: *Epilachna* Chevrolat in Dejean 1837.

Chnootribaires Mulsant 1850: 697. Type genus: *Chnootriba* Chevrolat in Dejean 1837.

Cynegetides C.G. Thomson 1866: 374. Type genus: *Cynegetis* Chevrolat in Dejean 1837.

Subcoccinellini Jakobson 1915: 968. Type genus: *Subcoccinella* Agassiz and Erichson 1845.

Madaini Gordon 1975: 206. Type genus: *Mada* Mulsant 1850.

Epivertini Pang and Mao 1979: 158. Type genus: *Epiverta* Dieke 1947.

Eremochilini Gordon and Vandenberg 1987: 6. Type genus: *Eremochilus* Weise 1912.

Diagnosis. According to phylogenetic analyses (Szawaryn et al. 2015), the tribe Epilachnini is strongly supported as monophyletic group embedded in the subfamily Coccinellinae sensu Ślipiński (2007). Morphological synapomorphies of the tribe include: the inner orbits of eyes emarginate antero-medially, closer near vertex than near mouthparts (except *Megatela*), mandible with multidentate apex and without molar part, and labial prementum oval. Other characters which also distinguish this group from the remaining Coccinellidae, are: relatively big and densely pubescent bodies often bearing contrasting patterns of red, yellow, and black spots, the eye not emarginate in anterior view, the mentum widest at or near base and the elytral surfaces with double sized punctures (except *Subcoccinella*).

Key to the Genera of Epilachnini

1. New World taxa 2
 - Old World taxa 10
2. Body elongate; mouthparts directed posteriorly (Fig. 2D) with maxillary lacinia plate-like and concave mesally and mentum

- strongly reduced; tarsi 3-3-3; tarsal claws single with quadrate tooth at base (Fig. 2B) *Eremochilus* Weise
- Body oval; mouthparts normally developed; tarsi 4-4-4; tarsal claws double with or without basal tooth or angulation (Figs. 11B and 23B)..... 3
- 3. Tarsal claws with basal tooth (Fig. 11B) or angulation 4
 - Tarsal claws smooth or weakly swollen at base (Fig. 23B) 6
- 4. Head without ventral antennal grooves; epipleural foveae absent; metaventral postcoxal lines joined on metaventral process in form of straight line without additional projections *Adira* Gordon and Almeida
- Head with ventral antennal grooves; epipleural foveae present; metaventral postcoxal lines joined on metaventral process in form of straight line usually with additional unisetose projections (Fig. 8D) 5
- 5. Abdominal postcoxal lines recurved, with additional short postcoxal line sub-parallel to the hind margin of ventrite 1 (Fig. 8E); penis guide on inner edge with additional process (Fig. 9J); ventral antennal grooves long, extending beyond hind margin of eyes; labrum very short membranous anteriorly (Fig. 7B); coloration usually dark (sometimes with brown maculae) with metallic shine *Damatula* Gordon
- Abdominal postcoxal lines recurved, without additional short postcoxal line (Fig. 12A and E); penis guide on inner edge often without additional process (Fig. 12I); ventral antennal grooves short, extending to hind margin of eyes only; labrum short, normal (Fig. 10B); coloration from yellow to dark brown without metallic shine..... *Mada* Mulsant
- 6. Tarsal claws with inner teeth touching one another forming cordate pattern (Fig. 14B); tibial spurs absent; terminal labial palpomere much narrower than penultimate one (Fig. 13G) *Malata* Gordon
- Tarsal claws do not form cordate pattern (Fig. 17B); at least mid and hind tibial spurs present; terminal labial palpomere about as wide as penultimate one..... 7
- 7. Tibiae of the mid and hind legs with oblique carina near apex (Figs. 17C and 20C) 8
 - Tibiae of the mid and hind legs without oblique carina near apex (Figs. 23C and 26C) 9
- 8. Elytral epipleuron with foveae receiving tips of femora; metaventral postcoxal lines joined on metaventral process in form of strongly arcuate line (Fig. 17E); abdominal postcoxal lines parallel to posterior margin of ventrite 1 or V-shaped (Fig. 18A); spermatheca absent (Fig. 18D)..... *Pseudodira* Gordon
- Elytral epipleuron without foveae; metaventral postcoxal lines joined on metaventral process in form of straight line (Fig. 20E); abdominal postcoxal lines recurved roundly or somewhat angulately (Fig. 21A and E); spermatheca present (Fig. 21K)..... *Lorma* Gordon
- 9. Mandibular incisor edge multidentate, its surfaces most often densely tuberculate (Fig. 22C and D); metaventral postcoxal lines descending and continuing as lateral bordering of metaventrite (Fig. 23E) (rarely descending and complete); fore tibia with single spur; abdominal postcoxal lines well developed (Fig. 24A and E); North, Central and South America *Epilachna* Chevrolat
- Mandibular incisor edge smooth, its surfaces without tubercles (Fig. 25C and D); metaventral postcoxal lines recurved or straight, rarely descending, complete (Fig. 26D); fore tibia with single spur, two spurs or without spurs; abdominal postcoxal lines sometimes reduced and hardly visible (Fig. 26E); South America..... *Toxotoma* Weise

10. Eyes with inner orbits closer anteriorly (near mouthparts) than near vertex (Fig. 28A); frons with distinct depression between eyes; head with dorsal antennal grooves (Fig. 28A); antennal scape very long (about 1/3 of total length of antenna) (Fig. 28E); mid and hind femora on inner edge in median part angulately produced posteriorly (Fig. 29E); Africa *Megatela* Weise
- Eyes with inner orbits closer posteriorly (near vertex) than near mouthparts (Fig. 31B); frons without depression between eyes; head without dorsal antennal grooves; antennal scape shorter (less than 1/3 of total length of antenna) (Fig. 31E); mid and hind femora on inner edge simple..... 11
11. Tarsal claws double with inner teeth touching one another forming a cordate pattern (Fig. 32B); male genitalia with penis guide asymmetrical (Fig. 33J); Africa ... *Figura* Ukrainsky
- Tarsal claws do not form cordate pattern; male genitalia with penis guide symmetrical..... 12
12. Prothoracic hypomeron coarsely punctured (Fig. 35D)..... 13
- Prothoracic hypomeron simply/finely punctate (Fig. 47D) 15
13. Ventral antennal grooves long and deep (Fig. 34A); prosternum in front of coxae longer than coxal longitudinal diameter at the same position (Fig. 35D); coxites deeply angulately emarginate on inner edge (Fig. 36K); Africa *Tropha* Weise
- Ventral antennal grooves, if present, short, extending at most to hind margin of eyes and rather shallow (Figs. 37A and 40A); prosternum in front of coxae usually 0.5–1.0 times as long as coxal longitudinal diameter, sometimes even less than 0.5 times as long as coxal longitudinal diameter (Figs. 38A and 41D); coxites simple on inner edge (Figs. 39K and 42K) 14
14. Mid and hind coxae with tubercles on their hind/inner margins (Fig. 38C); prosternal process with distinct lateral carinae (Fig. 38A); inner edge of metanepisternum serrate (Fig. 38D); Asia..... *Uniparodentata* Wang and Cao
- Mid and hind coxae without tubercles on their hind/inner margins; prosternal process sometimes with short, weak lateral carinae (Fig. 41D); inner edge of metanepisternum smooth; Africa *Solanophila* Weise
15. Antenna longer than width of head (including eyes); South and South-Eastern Asia 16
- Antennal length 0.5–1.0 times head width..... 17
16. Lateral margins of elytra widely explanate (Figs. 44A and 83E); metaventral and abdominal postcoxal lines absent (Fig. 44C and E) *Epiverta* Dieke
- Lateral margins of elytra not or hardly visible from above, sometimes narrowly explanate (Figs. 47A and 83A); metaventral and abdominal postcoxal lines present (Figs. 47E and 48A) *Afissa* Dieke
17. Metaventral postcoxal lines joined or very close on metaventral process, forming somewhat w-shaped line in middle (Figs. 50C and 53C) 18
- Metaventral postcoxal lines joined on metaventral process in form of straight or arcuate line (Fig. 56E), or sometimes lines widely separated (Fig. 62E)..... 19
18. Mandibular incisor edge with distinct denticles/teeth (Fig. 49C and D); female ventrite 6 completely (or almost) divided longitudinally (Fig. 51F); tegminal basal piece with a pair of spines on inner margin near base of tegminal strut (Fig. 51I and J); parameres almost always ending with small internal teeth (Fig. 51I); styli present or sometimes reduced and hardly visible *Henosepilachna* Li
- Mandibular incisor edge with weak microdenticulation (Fig. 52C); female ventrite 6 not divided longitudinally (Fig. 54E); tegminal basal piece simple, without spines on inner margin near base of tegminal strut (Fig. 54I and J); parameres simple apically (Fig. 54I); styli absent..... *Afidenta* Dieke
19. Mid and hind tibiae with oblique carina near apex (Fig. 56C); tarsal claws single with large basal tooth (Fig. 59B) or double without basal tooth (Fig. 56B and 62B)..... 20
- Mid and hind tibiae without oblique carina near apex (Fig. 68C); tarsal claws double with (Fig. 77B) or without basal tooth (Fig. 68B); rarely apices of tibiae with oblique carina but then tarsal claws with large basal tooth (Fig. 74B) and apical labial palpomere much narrower than penultimate one (Fig. 73G)..... 23
20. Tibial spurs absent; terminal labial palpomere much narrower than penultimate one (Fig. 55G); head with ventral antennal grooves short, extending to hind margin of eyes only (Fig. 55A); Africa *Merma* Weise
- One spur on fore tibiae and two spurs on mid- and hind tibiae; terminal labial palpomere about as wide as penultimate one (Fig. 58G); ventral antennal grooves on head, if present, then long, extending beyond hind margin of eyes (Fig. 58A); Palaearctic and Oriental regions..... 21
21. Tarsal claw single with large basal tooth (Fig. 59B); ventral antennal grooves long (Fig. 58A); elytral epipleuron with foveae for apices of mid and hind femora (Fig. 59A); outer edges of front tibiae strongly expanded/inflated (Fig. 59E); Palaearctic region..... *Cynegetis* Chevrolat
- Tarsal claws bifid, lacking basal tooth (Figs. 62B and 65B); ventral antennal grooves absent (Figs. 61A and 64A); elytral epipleuron smooth without foveae; outer edges of front tibiae simple (Fig. 65D)..... 22
22. Mandibular incisor edge smooth (Fig. 61C); metaventral postcoxal lines widely separated on metaventral process (Fig. 62E); metaventral process with coarse punctures (Fig. 62E); elytral surface dually punctate; styli absent; Oriental region: India *Macrolasia* Weise
- Mandibular incisor edge multidentate (Fig. 64C); metaventral postcoxal lines joined on metaventral process (Fig. 65E); metaventral process simply/finely punctate; elytral surface with single sized punctures; Palaearctic region *Subcoccinella* Agassiz and Erichson
23. Metanepisternum with inner edge serrate; female genitalia with coxites much longer than wide (Fig. 69K); prosternal process most often with lateral carinae; Asia *Diekeana* Tomaszewska and Szawaryn
- Metanepisternum with inner edge smooth; female genitalia with coxites short oval, less than 2 times as long as wide; prosternal process without lateral carinae..... 24
24. Prementum subquadrate, ligula produced anteriorly forming sub-rectangular membranous projection (Fig. 70G); female ventrite 6 (sternite VIII) with basal/anterior margin roundly projected anteriorly in middle (Fig. 72G); Africa, Madagascar..... *Cleta* Mulsant
- Prementum subtriangular or oval, ligula simple, not produced anteriorly (Fig. 79H); Female ventrite 6 (sternite VIII) with basal/anterior margin simply arcuate posteriorly (Fig. 78F) 25
25. Labial terminal palpomere distinctly narrower than penultimate one (at most 0.7× as wide as penultimate palpomere) (Fig. 73G); styli absent (Fig. 75K); Asia and Africa..... *Afidentula* Kapur

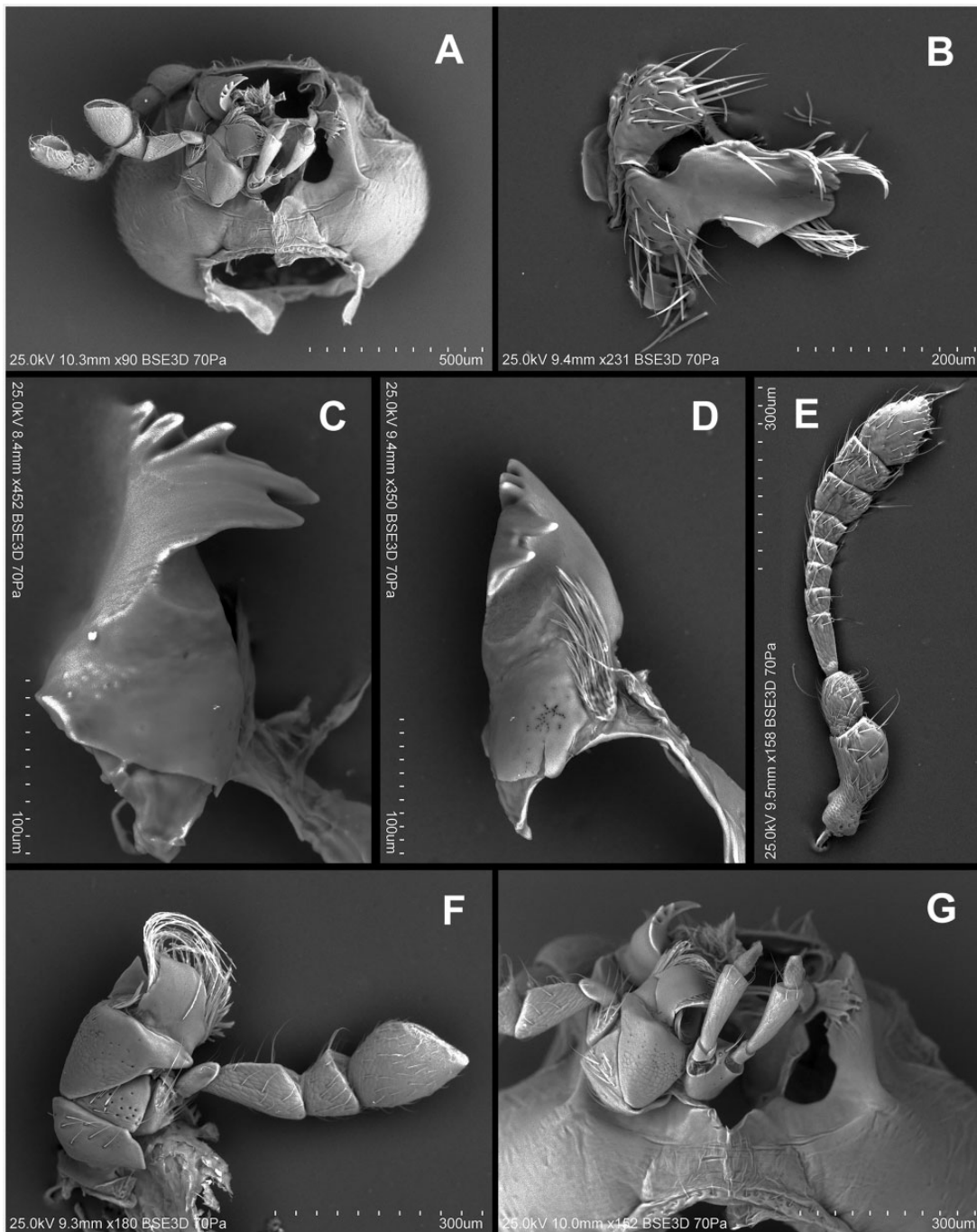


Fig. 1. *Eremochilus* sp. (A) Head, ventral view, (B) Labrum, (C, D) Mandibles, (E) Antenna, (F) Maxilla, and (G) Ventral mouthparts.

- Labial terminal palpomere about as wide as penultimate one (Figs. 76G and 79H); styli distinct or reduced (Figs. 78J and 81K)..... 26
- 26. Female ventrite 6 (sternite VIII) completely or almost divided longitudinally at middle or appears to be divided (with longitudinal suture) (Fig. 78F); [ventral antennal grooves short or absent; abdominal postcoxal lines sometimes strongly reduced; sclerite anteriorly to coxites in membrane connecting paraprocts sometimes present]; Africa *Chnootriba* Chevrolat
- Female ventrite 6 (sternite VIII) not divided longitudinally (Fig. 81F); [ventral antennal grooves absent; abdominal

postcoxal lines well developed; membrane connecting paraprocts anteriorly to coxites without sclerite]; Australian Region .
..... *Papuaepilachna* Szawaryn and Tomaszewska

Genera of Epilachnini

Eremochilus **Weise 1912**
(Figs. 1–3 and 82E)

Eremochilus **Weise 1912**: 117. Type species: *Eremochilus peregrinus* **Weise 1912** (by monotypy).—**Jadwiszczak and Węgrzynowicz 2003**: 208, **Szawaryn et al. 2015**: 561, 565.

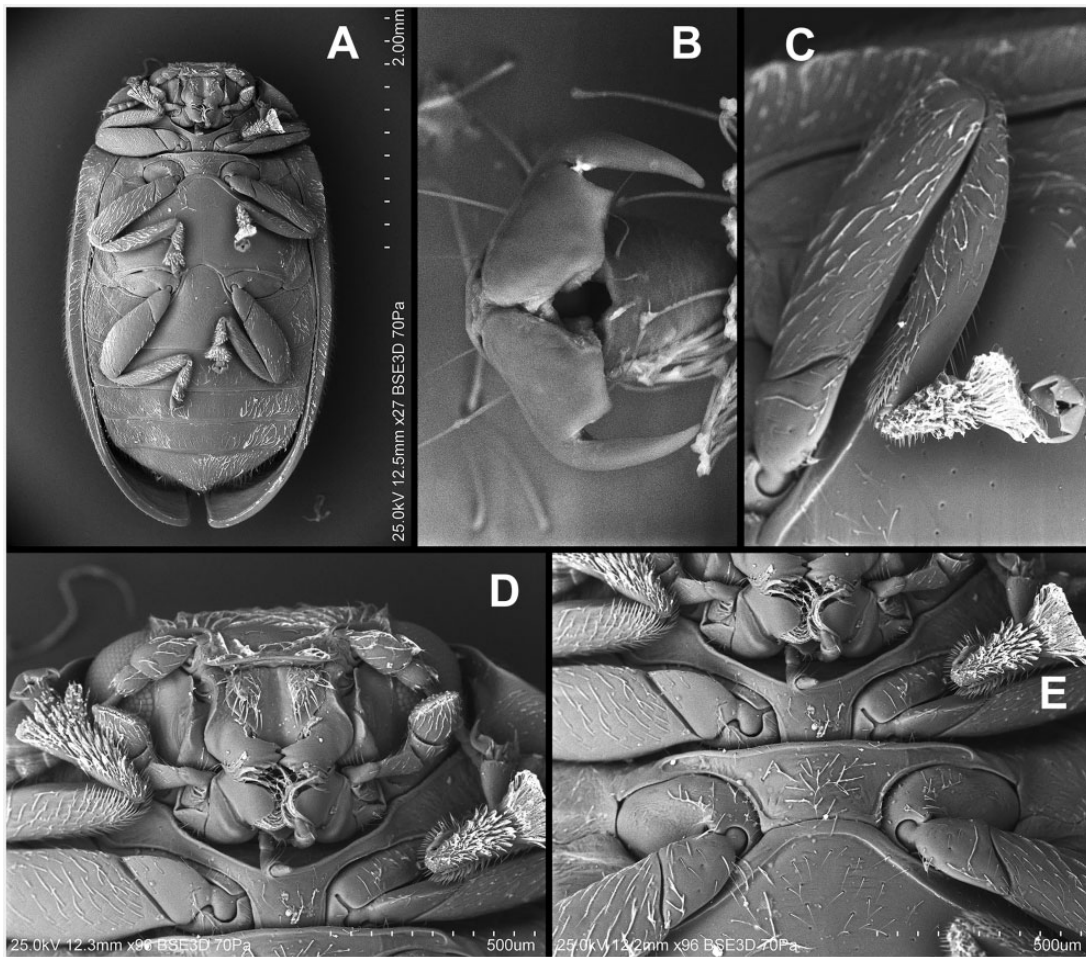


Fig. 2. *Eremochilus* sp. (A) Body, ventral view, (B) Tarsal claws, (C) Mid leg, (D) Head and prothorax, ventral view, and (E) Pro-, meso-, and metathorax, ventral.

Diagnosis. *Eremochilus* can be easily distinguished from all other Epilachnini by the long oval body, ventral antennal grooves long, circular, bent towards outer margin of eye, the mouthparts directed posteriorly with maxillary lacinia plate-like and concave mesally, mentum strongly reduced, and tarsal claws single with quadrate tooth at base.

Description. Length 3.5–4.0 mm. Body elongate (Figs. 2A and 82E), convex; dorsum with short pubescence. Elytra yellowish brown or black.

Head. Interocular distance 0.50–0.75 head width. Inner orbits not emarginate antero-medially. Gular sutures shorter than half length of gula. Antenna (Fig. 1E) composed of 10 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 elongate; antennomeres 4–5 subquadrate; antennomeres 6 and 7 transverse; club symmetrical. Ventral antennal grooves long, circular bent towards outer margin of eye (Fig. 1A and G). Dorsal antennal grooves absent. Clypeus short, parallel-sided, anterior margin straight with weak groove. Labrum (Figs. 1B and 2D) triangular, highly modified, with long sclerotized projection curved ventrally, setose laterally, glabrous at median part. Mandible (Figs. 1C–D and 2D) multidentate apically forming “channel” at inner edge, lacking incisor edge, surfaces smooth, and prostheca reduced. Maxilla (Fig. 1F) with cardo transverse; stipes much longer than galea with suture between basistipes and mediostipes well visible; lacinia plate-like, concave mesally with mesial surface glabrous;

galea oval, well developed, mostly sclerotized, bent inwardly, ventral surface glabrous; terminal palpomere weakly elongate with sides subparallel. Submentum with deep emargination and suture not clearly visible; mentum reduced or absent; prementum oval, ligula without setae; labial palps separated by distance distinctly less than width of palpiger; apical palpomere distinctly shorter and narrower than penultimate one (Fig. 1G).

Prothorax. Hypomeron finely punctate. Prosternal process (Fig. 2D and E) smooth, without carinae, weakly bordered laterally. Prosternum in front of coxa shorter than half of coxal longitudinal diameter, its anterior margin broadly and deeply arcuate (Fig. 2E). Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 2E) with anterior edge straight, anterior border entirely raised; mesoventral process smooth with lateral bordering; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins not visible from above. Epipleuron (Fig. 2A) incomplete apically, smooth; inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines joined on metaventral process in weakly arcuate line, laterally complete, and distinctly recurved.

Legs (Fig. 2A and C) slender with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and

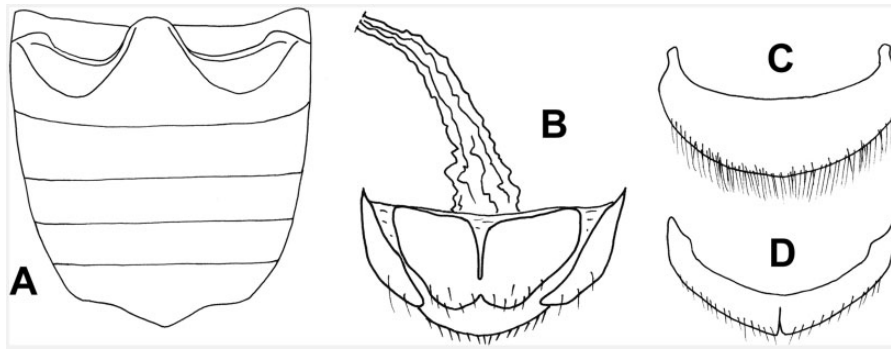


Fig 3. *Eremochilus* sp. (A) Abdomen, female, ventral, (B) Female genitalia, (C) Abdominal tergite VIII, female, ventral, and (D) Abdominal ventrite 6, female.

mid trochanters simple without cavities for receiving tip of tibiae. Mid and hind coxa simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge smooth, without carina (Fig. 2C). Tibial spurs absent. Tarsus 3-segmented; tarsal claws single with quadrate basal tooth (Fig. 2B).

Abdomen. Six ventrites in both sexes. Abdominal postcoxal lines (Fig. 3A) recurved roundly and complete laterally, without additional line. In female: apical margin of ventrite 5 rounded laterally and triangularly produced posteriorly at middle (Fig. 3A); ventrite 6 rounded apically, with basal margin arcuate, longitudinally looking like divided but connected by membrane (Fig. 3D); tergite VIII rounded at apex (Fig. 3C). Proctiger (TX) rounded.

Male genitalia (Gordon and Vandenberg 1987: 7). Tegminal basal piece without spines. Penis guide entire at apex; outer edge smooth or setose; inner edge without additional process. Parameres well developed, simple apically. Penis base with reduced T-shaped capsule.

Female genitalia (Fig. 3B). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, subtriangular; outer edge of coxite free, inner edge straight or rounded, ventral surface smooth. Styli absent. Bursa copulatrix without sclerite, nondivided; sperm duct and spermatheca absent.

Distribution. Bolivia, Brazil, Mexico.

Species included (examined). *Eremochilus weisei* Gordon and Vandenberg, *E. peregrinus** Weise.

Comment. We were able to examine two of three known species of *Eremochilus*, as listed in Jadwiczak and Węgrzynowicz (2003).

Adira Gordon and de Almeida 1986 (Figs. 4–6 and 82A)

Epilachna (*Dira*) Mulsant 1850: 849 (nec *Dira* Hübner 1819: 60). Type species: *Coccinella obscuricincta* Klug 1829 (by subsequent designation of Gordon 1975).

Adira Gordon and de Almeida 1986: 365 (replacement name for *Dira* Mulsant 1850).—Jadwiczak and Węgrzynowicz 2003: 13, Szawaryn et al. 2015: 559, 565.

Diagnosis. Among New World genera *Adira* is most similar to *Mada* and *Damatula* by body size and shape, and having tarsal claws double with basal tooth or distinct angulation. However, *Adira* can be separated from both these genera by head without ventral antennal grooves, elytral epipleura without foveae, and meta-ventral postcoxal lines joined on metaventral process in form of

straight line lacking additional projections (often present in *Mada* and *Damatula*).

Description. Length 4.5–6.3 mm. Body oval (Figs. 5A and 82A), strongly convex, dorsum pubescent. Elytra orange-brown or brown with yellow and/or brown and/or black bordering.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 4A) at least as long as half length of gula. Antenna (Fig. 4E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 elongate; antennomeres 4–8 weakly elongate, subquadrate or transverse; club asymmetrical. Ventral and dorsal antennal grooves absent (Fig. 4A). Clypeus short, parallel-sided, its anterior margin emarginate, smooth without groove. Labrum (Fig. 4B) transverse, two times broader than long, emarginate at apex. Mandible (Fig. 4C and D) multidentate apically; incisor edge multidentate, its surfaces smooth, prosthema well developed. Maxilla (Fig. 4F) with cardo semicircular; stipes much longer than galea, with suture between basistipes and mediostipes well visible; lacinia simple, its mesal surface simply setose; galea oval, about as long as wide, mostly sclerotized, ventral surface at least sparsely pubescent; terminal palpomere elongate, broadened apically or at least weakly elongate, parallel-sided, or weakly expanded apically. Submentum short, transverse, about four times broader than long with suture well visible; mentum (Fig. 4G) about two times broader than long, widest near base; prementum oval, ligula without setae; labial palps separated by distance distinctly less than width of palpiger; apical palpomere about as long and as broad as penultimate one (Fig. 4G), sometimes distinctly narrower than penultimate palpomere.

Prothorax. Hypomeron simply/finely punctate (Fig. 5D). Prosternal process (Fig. 5D) smooth, without carinae, bordered laterally. Prosternum in front of coxa 0.5–1.0 times length of coxal longitudinal diameter, its anterior margin weakly arcuate. Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 5E) with anterior edge weakly emarginate, anterior border entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins rather narrow but entirely visible from above. Epipleuron (Fig. 5A) incomplete apically, smooth, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines (Fig. 5E) joined on metaventral process in straight line, laterally complete and distinctly recurved.

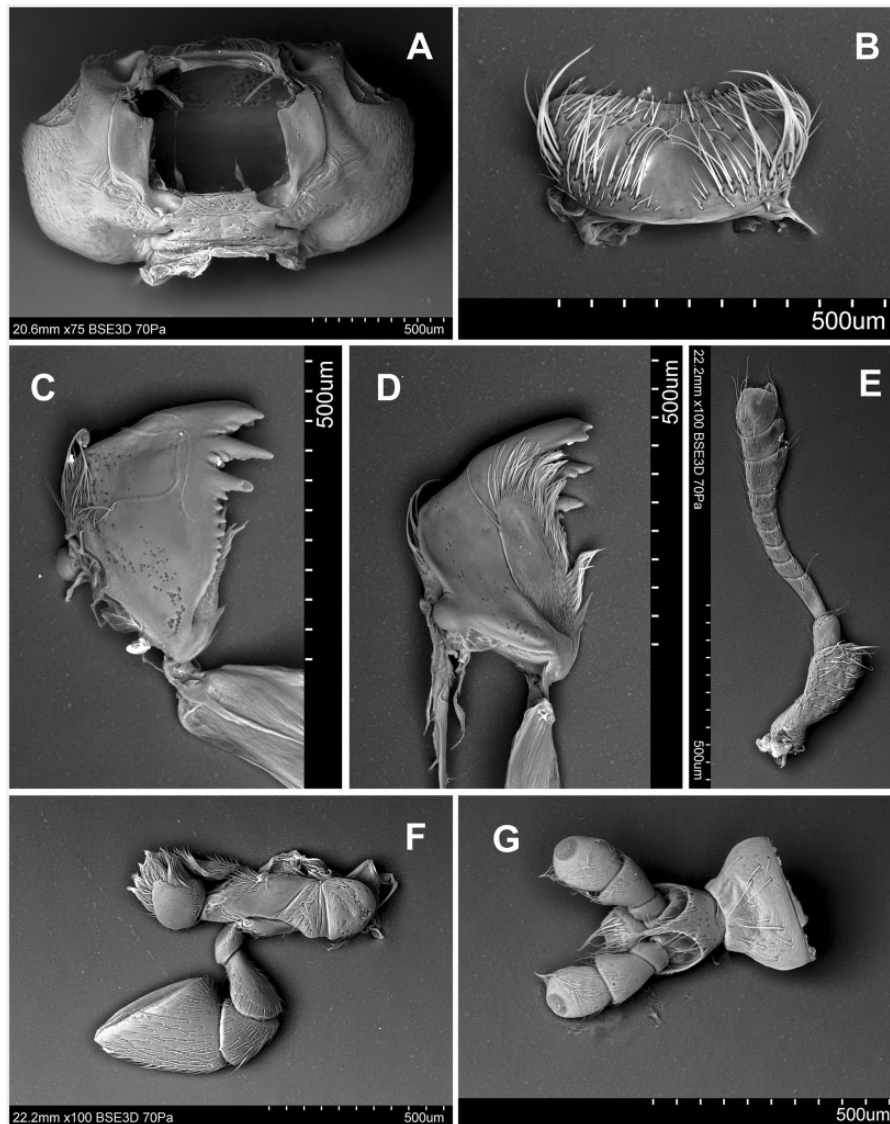


Fig. 4. *Adira obscuricincta* Klug. (A) Head, ventral view, (B) Labrum, (C) Mandible, dorsal view, (D) Mandible, ventral view, (E) Antenna, (F) Maxilla, and (G) Labium.

Legs (Fig. 5A and E) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters roundly produced, with cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora swollen, simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 5C). Tibial spurs: 1-2-2. Tarsal claws (Fig. 5B) double with basal angulation.

Abdomen (Fig. 6A and F). Six ventrites in males and five in females. Abdominal postcoxal lines recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 weakly emarginate; ventrite 6 emarginate (Fig. 6B); tergite VIII rounded (Fig. 6C); apodeme of sternum IX simple, rod-like (Fig. 6G); tergite X subtriangular. In female: apical margin of ventrite 5 rounded with triangular projection at middle (Fig. 6F); sternite VIII (Fig. 6D) rounded apically, with simple arcuate basal margin, longitudinally at middle not divided but with visible suture; tergite VIII weakly rounded (Fig. 6E). Proctiger (TX) rounded (Fig. 6K).

Male genitalia (Fig. 6H–J). Tegminal basal piece without spines. Penis guide symmetrical, about as long as parameres or longer, entire at apex; outer edge smooth or sparsely setose; inner edge without additional process. Parameres well developed, simple and setose apically. Penis stout, weakly curved, T-shaped capsule reduced.

Female genitalia (Fig. 6K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, subtrapezoidal; outer edge of coxite free, inner edge simple, rounded, ventral surface smooth. Styli absent. Bursa copulatrix without sclerite, nondivided, with common oviduct entering at base. Sperm duct originated apically on bursa copulatrix. Spermatheca with only nodulus developed.

Distribution. South America: Argentina, Bolivia, Brazil, Colombia, French Guiana, Panama, Paraguay, Peru, Uruguay.

Species included (examined). *Adira clarkii* (Crotch), *A. gossypoides* Gordon, *A. nucula* (Weise), *A. obscuricincta** (Klug).

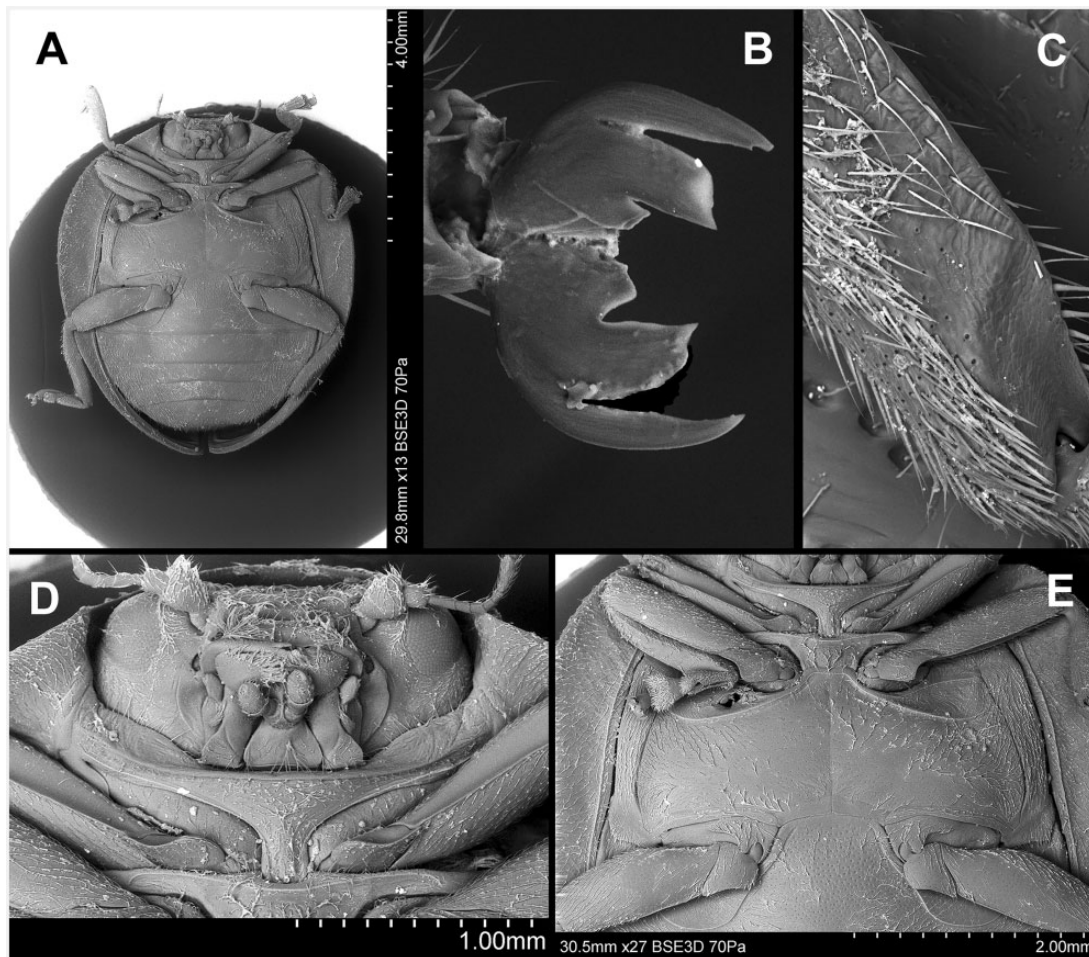


Fig. 5. *Adira obscurocincta* Klug. (A) Body, ventral view, (B) Tarsal claws, (C) Mid tibia, (D) Head and prothorax, ventral view, and (E) Pro-, meso-, and metathorax, ventral.

Comment. We studied four of nine known species, as listed in Jadwiszczak and Węgrzynowicz 2003.

Damatula Gordon 1975
(Figs. 7–9)

Damatula Gordon 1975: 236. Type species: *Epilachna fairmairii* Mulsant 1850 (by original designation).—Jadwiszczak and Węgrzynowicz 2003: 194; Szawaryn et al. 2015: 559, 565.

Diagnosis. Among New World genera of Epilachnini, *Damatula* is most similar to *Mada* and *Adira* by body size and shape, and sharing tarsal claws double with basal tooth or distinct angulation. *Damatula* however, can be separated from both these genera by having short labrum, head with long ventral antennal grooves, extending beyond hind margin of eyes, abdominal postcoxal lines recurved roundly or angulately, and provided with additional short postcoxal line sub-parallel to the hind margin of ventrite 1, penis guide on inner edge with additional process and body coloration with metallic shine.

Description. Length 3.7–5.4 mm. Body oval (Fig. 8A), strongly convex, dorsum pubescent. Elytra usually black with metallic shine—bluish, greenish, or purplish, sometimes elytra brown with pale macula on disc of elytron.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Gular sutures at least as long as half length of gula. Antenna (Fig. 7E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 elongate; antennomeres 4–8 subquadrate; club asymmetrical. Ventral antennal grooves long, straight, reaching distinctly behind eyes. Dorsal antennal grooves absent. Clypeus parallel-sided, its anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 7B) very short, broadly weakly emarginate. Mandible (Fig. 7C and D) multidentate apically; incisor edge without teeth, its surfaces smooth or provided with weak tubercles, prosthema narrow. Maxilla (Fig. 7F) with cardo semicircular; stipes much longer than galea with suture between basistipes and mediostipes well visible; lacinia simple, its mesal surface simply setose; galea oval, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere (Fig. 7A and F) at least weakly elongate, expanded apically. Submentum transverse, about two times wider than long; mentum (Fig. 7G) at least two times broader than long, widest at base; prementum oval with emargination at anterior margin, ligula membranous expanded apically, with long setae at anterior margin; labial palps (Fig. 7G) separated by distance at least equal to width of palpiger; apical palpomere as long as and distinctly narrower than penultimate one.

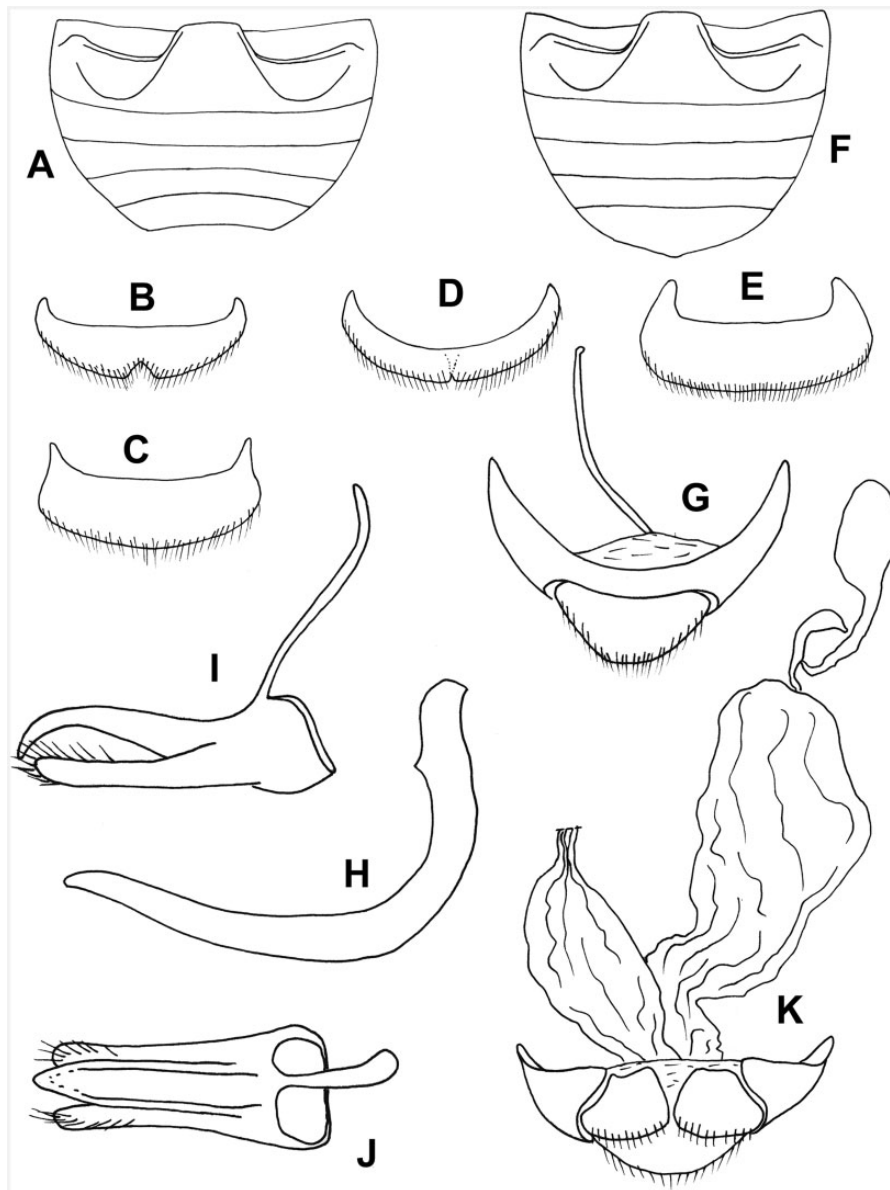


Fig. 6. *Adira obscurocincta* Klug. (A) abdomen, male, ventral, (B) Abdominal ventrite 6, male, (C) Abdominal tergite VIII, male, ventral, (D) Abdominal sternite VIII, female, ventral, (E) Abdominal tergite VIII, female, ventral. (F) Abdomen, female, ventral, (G) Male genital segment, (H) Penis, (I) Tegmen, ventral view as placed in abdomen, (J) Tegmen, its inner view, and (K) Female genitalia.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 8D) smooth, without carinae, bordered laterally. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter, its anterior margin continuing as nearly straight line. Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 8D and E) with anterior edge weakly emarginate, anterior border entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Elytra dually punctate; lateral margins of elytra narrow but entirely visible from above. Epipleuron (Fig. 8A) incomplete apically, with foveae for receiving tips of femora, its inner margin with bordering line extending at most to level of mid coxa. Metaventral postcoxal lines joined on metaventral process in straight line with

two widely separated, rounded, unisetose projections (Fig. 8E), laterally complete, and recurved or straight.

Legs (Fig. 8A) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters roundly or angulately produced. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 8C). Tibiae without distinct spurs. Tarsal claws double with distinct basal angulation (Fig. 8B).

Abdomen. Six ventrites in males and five or six ventrites in females. Abdominal postcoxal lines recurved angulately and incomplete, with additional line parallel to hind margin of ventrite. In male: apical margin of ventrite 5 (Fig. 9A) truncate or emarginate medially; ventrite 6 (Fig. 9F) emarginate or notched medially at apex; tergite VIII (Fig. 9G) rounded or weakly emarginate; apodeme

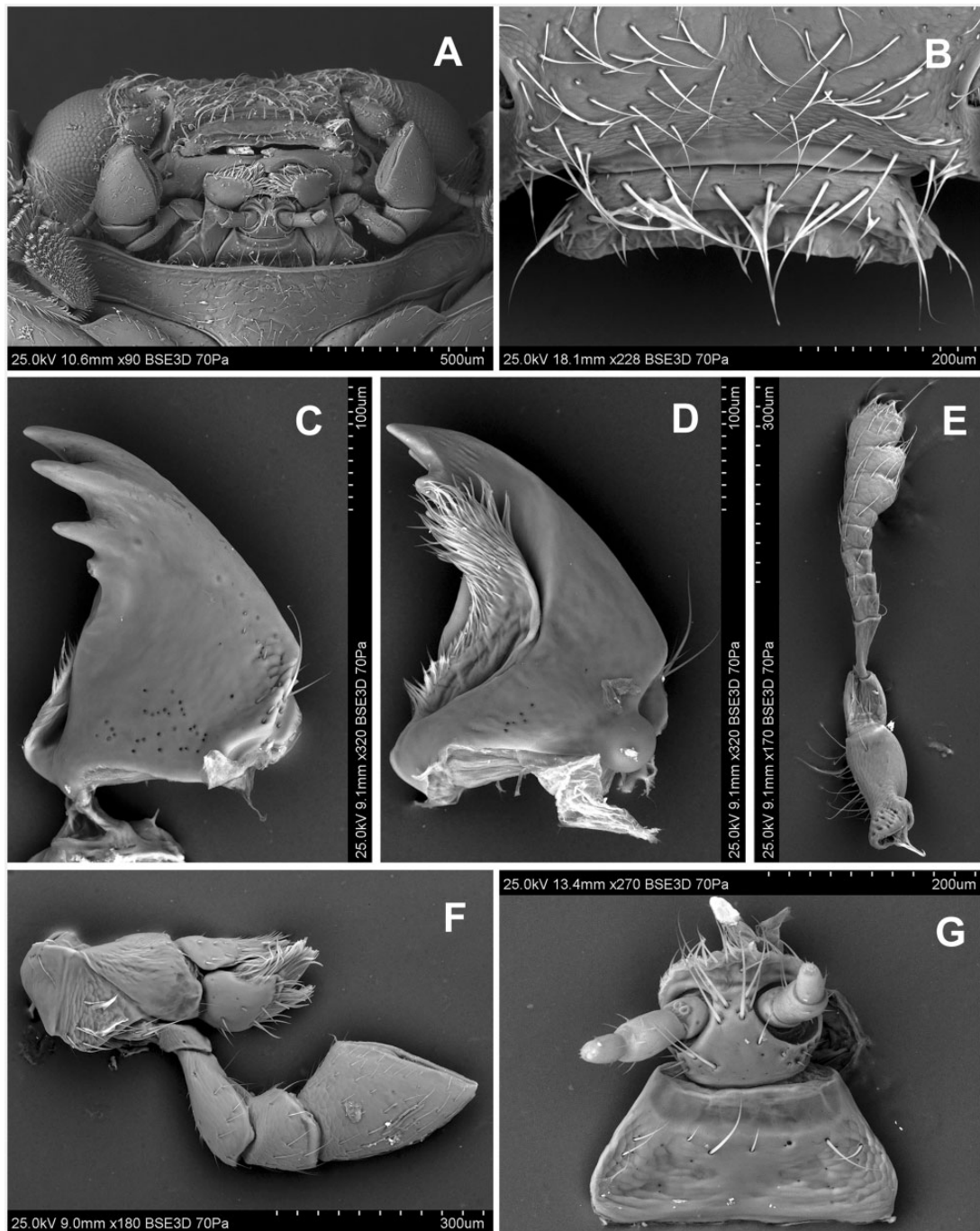


Fig. 7. *Damatula schwarzi* Gordon. (A) Head, ventral view; (B) Clypeus and labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

of sternum IX simple, rod-like (Fig. 9D); tergite X subtriangular. In female: apical margin of ventrite 5 (Fig. 9E) weakly truncate; ventrite 6 (Fig. 9B) rounded, with simple arcuate basal margin, medially with longitudinal suture; tergite VIII rounded at apex (Fig. 9C). Proctiger (TX) transverse, tuncate apically.

Male genitalia (Fig. 9H–J). Tegminal basal piece without spines. Penis guide symmetrical, shorter or as long as parameres, at apex bent, entire; outer edge smooth or at most setose; inner edge with additional process. Parameres well developed, simple apically. Penis simple, rod-like, slightly curved apically, with T-shaped capsule reduced.

Female genitalia (Fig. 9K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, oval with anterolateral projection; outer edge of coxite free, inner edge simple—rounded, ventral surface smooth. Styli absent. Bursa copulatrix without sclerite, simple, non-divided with common oviduct entering apically or ventrally. Sperm duct originated apically on bursa copulatrix.

Distribution. South and Central America: Colombia, Brazil, Panama.

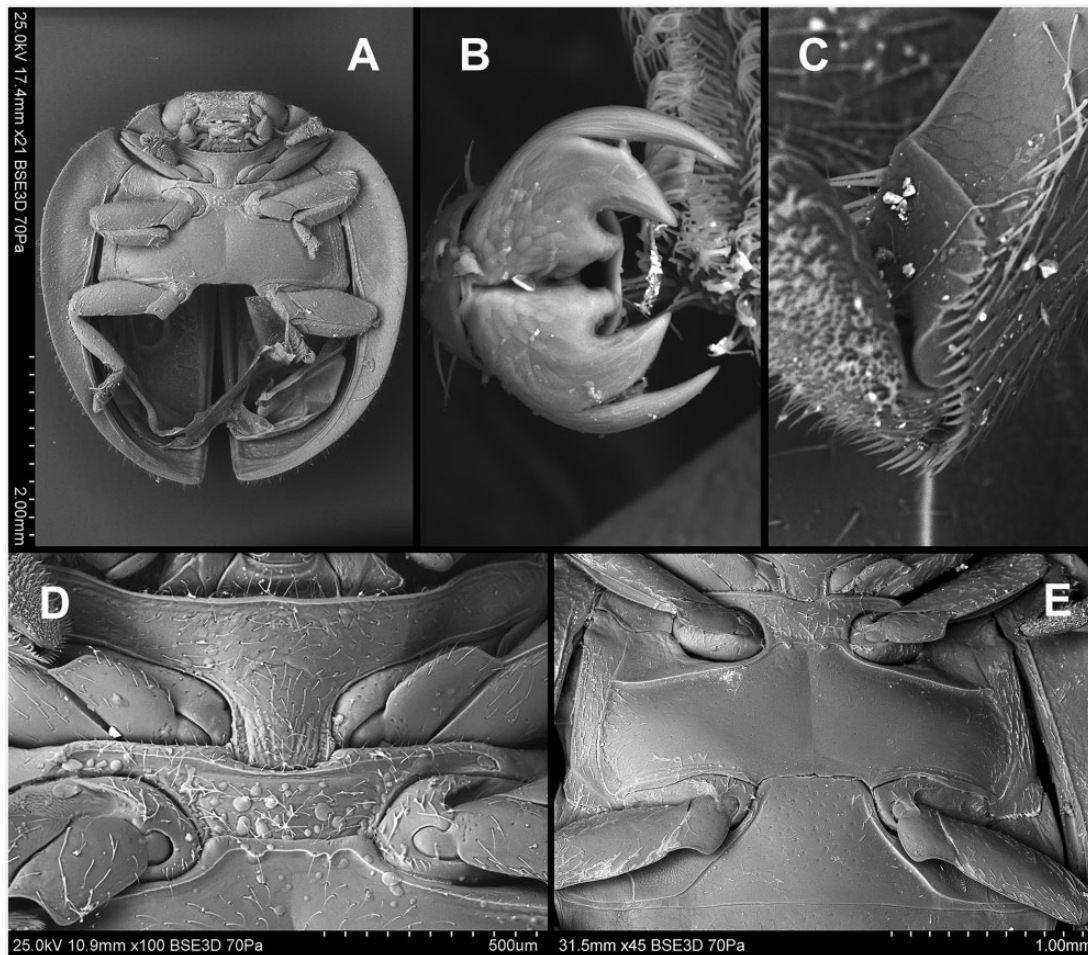


Fig. 8. *Damatula schwarzi* Gordon. (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Prosternum, mesoventrite, and base of metaventrete; (E) Meso- and metathorax, and abdominal ventrite 1.

Species included (examined). *Damatula carnegiana* Grodon, *D. colombiana* Gordon *Damatula fairmairii** (Mulsant), *D. porioides* (Weise), *D. schwarzi* Gordon, *D. yurimagi* Gordon.

Comment. We examined six of nine known species of *Damatula*, as listed in [Jadwiszczak and Węgrzynowicz \(2003\)](#).

Mada Mulsant 1850
(Figs. 10–12 and 82F)

Epilachna (*Mada*) Mulsant 1850: 858. Type species, *Epilachna fraterna* Mulsant 1850 (by subsequent designation of [Korschefsky 1931](#)).

Mada: [Korschefsky 1931](#): 68.—[Gordon 1975](#): 217, [Jadwiszczak and Węgrzynowicz 2003](#): 197, [Szawaryn et al. 2015](#): 559, 565.

Ladoria Mulsant 1850: 928. Type species, *Ladoria desarmata* Mulsant 1850 (by monotypy). Synonymized by [Gordon 1975](#): 217.

Diagnosis. According to the phylogenetic analysis ([Szawaryn et al. 2015](#)), *Mada* does not constitute a monophyletic group but we were not able to resolve its status due to the limited material available for study. Among the New World genera, *Mada* is most similar to *Adira* and *Damatula* by the body size and shape, and the double tarsal claws with basal tooth or distinct angulation. However, it can

be separated from *Adira* by having head with ventral antennal grooves, elytral epipleura with foveae and metaventral postcoxal lines joined on metaventral process in form of straight line. Abdominal postcoxal lines recurved roundly or angulately but without additional short postcoxal line, penis guide on inner edge without additional process, ventral antennal grooves short, extending to hind margin of eyes only, and body coloration without metallic shine distinguish *Mada* from *Damatula*.

Description. Length 3.25–5.75 mm. Body (Figs. 11A and 82F) round oval to elongate oval, convex, pubescent, variably colored.

Head. Inner orbits emarginate antero-medially, closest posteriorly. Gular sutures shorter than half length of gula or at least as long as half length of gula. Antenna (Fig. 10E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomeres 6 and 7 very short, transverse or subquadrate; two subterminal segments asymmetrical. Ventral antennal grooves short, straight, along inner margin of eye only; dorsal antennal grooves absent. Clypeus (Fig. 10A) parallel-sided, anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 10B) short, weakly emarginate, covered with long setae anteriorly. Mandible (Fig. 10C and D) multidentate apically; incisor edge multidentate or without teeth, its surfaces smooth, prosthema well developed, setose. Maxilla (Figs. 10F and 11D) with cardo subquadrate reaching at most slightly outside of mouth cavity; maxillary stipes much longer than galea, with suture between basistipes and

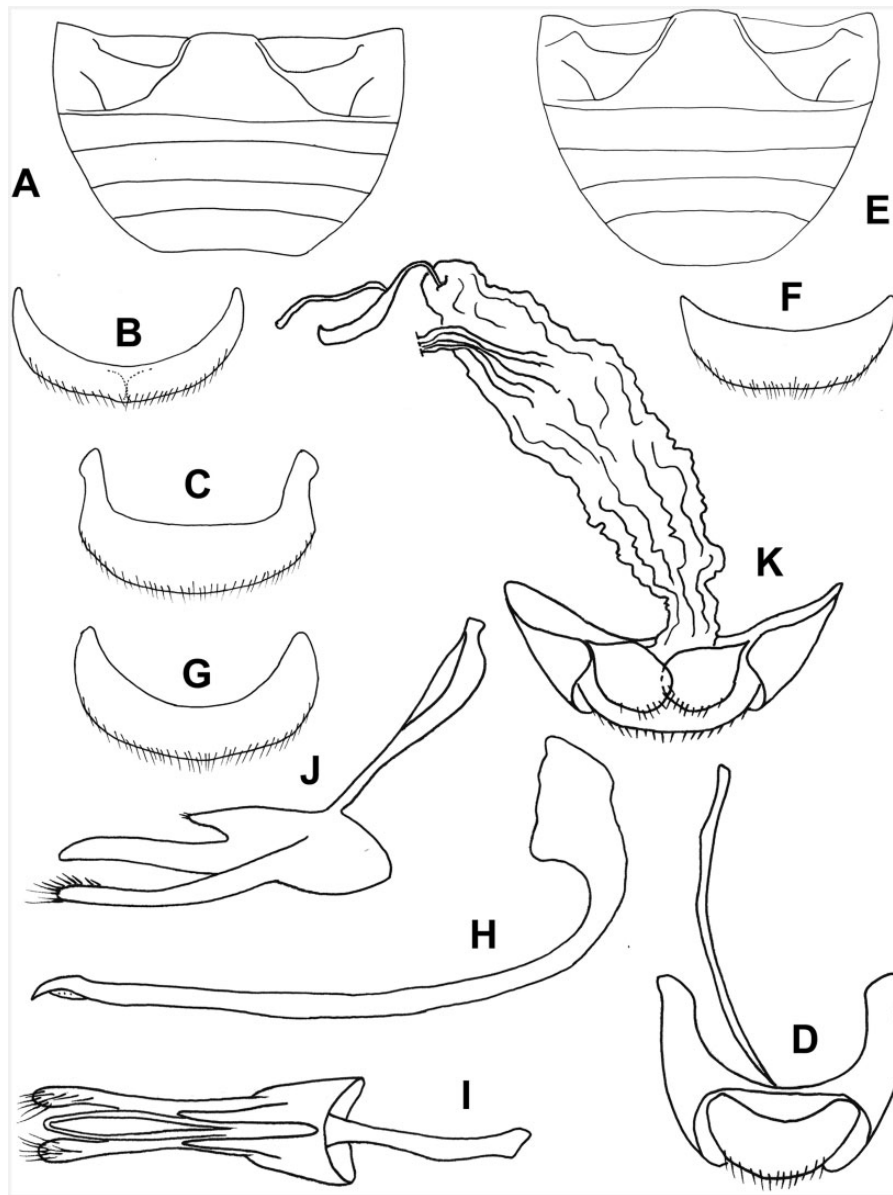


Fig. 9. *Damatula schwarzi* Gordon. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, female; (C) Abdominal tergite VIII, female, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal ventrite 6, male; (G) Abdominal tergite VIII, male; (H) Penis; (I) Tegmen, its inner view; (J) Tegmen, ventral view as placed in abdomen; (K) Female genitalia.

mediostipes at least partly well visible; lacinia simple, its mesal surface simply setose; galea, as long as wide or weakly elongate, mostly sclerotized, its ventral surface at least sparsely pubescent; terminal palpomere elongate, broadened apically. Mentum (Figs. 10G and 11D) transverse, less or more than two times broader than long, widest near base, or sides subparallel; prementum oval, ligula shortly setose, or without setae; labial palps (Fig. 10G) separated by distance distinctly less than width of palpiger; apical palpomere as long as or longer and distinctly narrower than penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 11E) smooth, without carinae. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter, its anterior margin continuing as straight or arcuate line (Fig. 11D). Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 11E) with intercoxal process smooth. Inner edge of metanepisternum smooth. Scutellum

triangular, at least as long as broad. Metendosternite with tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins rather narrow but entirely visible from above. Epipleuron (Fig. 11A) with foveae for receiving tips of femora, inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines joined on metaventral process in straight line (Fig. 11E), often with two widely separated, rounded, setose projections, laterally complete, and recurved.

Legs rather stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron (Fig. 11A). Fore and mid trochanters roundly or angulately produced. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 11C). Tibial spurs: 1-2-2, or spurs absent. Tarsal claws double with large basal tooth (Fig. 11B) or with basal angulation.

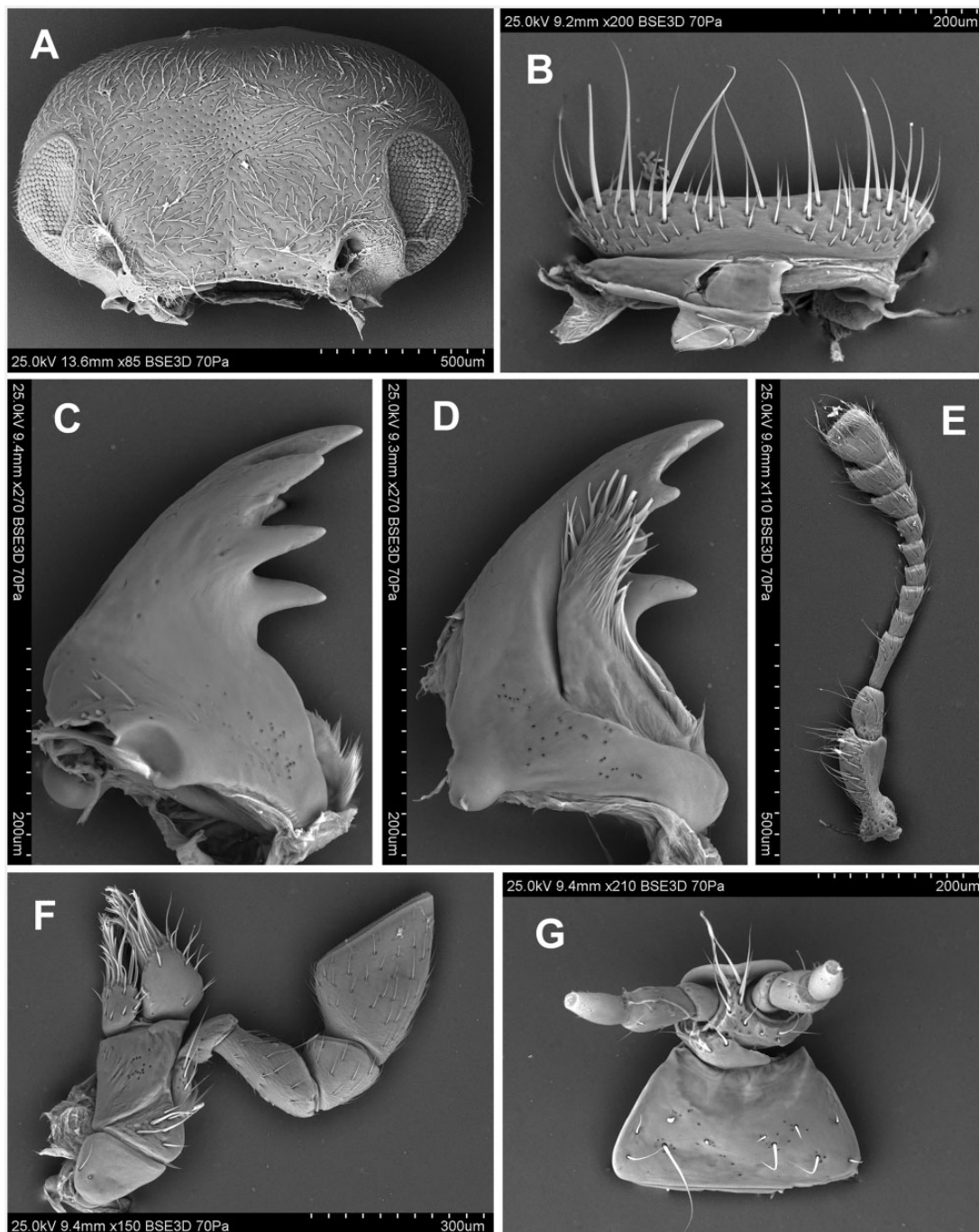


Fig. 10. *Mada inepta* (Gorham). (A) Head, dorsal view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

Abdomen. Six ventrites in males and five ventrites in females. Abdominal postcoxal lines (Fig. 12A and E) recurved roundly or angulately but incomplete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 12A), rounded or feebly emarginate; ventrite 6 truncate, emarginate or notched medially (Fig. 12B); tergite VIII rounded or emarginate apically (Fig. 12C); apodeme of sternum IX narrow, rod-like (Fig. 12D). Tergite X (Fig. 12D) rounded or truncate. In female: apical margin of ventrite 5 triangularly produced medially or weakly rounded (Fig. 12E); ventrite 6 (Fig. 12F) rounded apically with arcuate basal margin, longitudinally at middle looking like divided but connected by membrane;

tergite VIII rounded (Fig. 12G). Proctiger (TX) with posterior margin simple, rounded or truncate (Fig. 12K) to weakly emarginate.

Male genitalia (Fig. 12H–J). Tegminal basal piece without spines. Penis guide symmetrical, slightly longer or shorter than parameres, entire and pointed at apex, often curved outwardly apically; outer edge smooth; inner edge without additional process. Parameres well developed, simple apically. Penis moderately long and stout, distinctly curved near base, with reduced arms of basal capsule.

Female genitalia (Fig. 12K). Sclerite anteriorly to coxites in membrane connected paraprocots absent. Coxites distinctly less than two

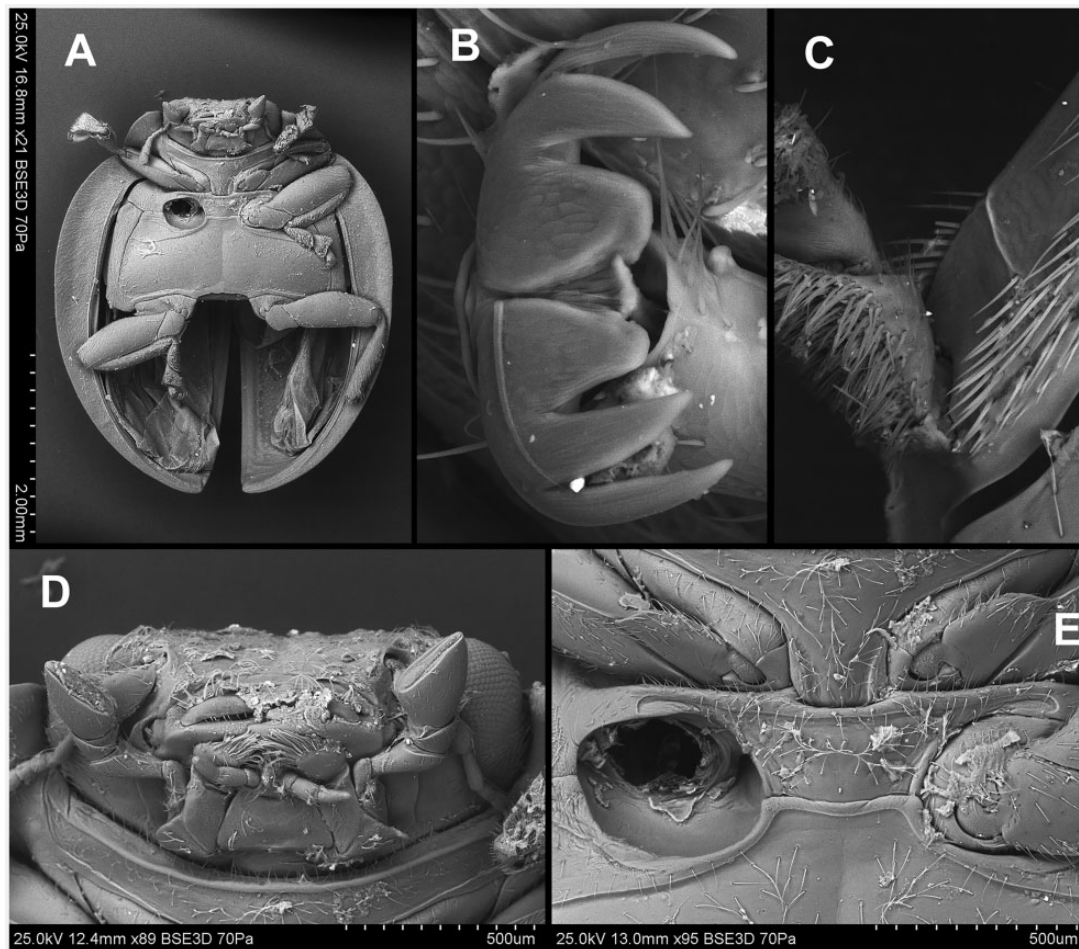


Fig. 11. *Mada inepta* (Gorham). (A) Body, ventral view; (B) Tarsal claws; (C) Hind tibia, apex; (D) Head and base of prothorax, ventral; (E) Prosternal process, mesoventrite and base of metaventrite.

times longer than wide, oval; outer edge of coxite free, inner edge simple—straight, rounded, or weakly emarginate, ventral surface smooth. Styli distinct. Bursa copulatrix without sclerite. Sperm duct originated dorsally or apically on bursa copulatrix. Spermatheca without nodulus and ramus or sometimes only nodulus present.

Distribution. Central and South America: Bolivia, Brazil, Colombia, Costa Rica, Ecuador, French Guiana, Mexico, Panama, Paraguay, Peru, Venezuela.

Species included (examined): *Mada amydra* Gordon, *M. andeana* Szawaryn, *M. circumducta* (Mulsant), *M. circumflua* (Mulsant), *M. inepta* (Gorham), *M. lineatopunctata* (Germar), *M. nexophallus* Gordon, *M. polluta* (Mulsant), *M. synemia* Gordon, *M. virgata* (Mulsant).

Comment. We agree with Gordon (1975) that *Mada* is not a homogeneous genus thorough taxonomic revision is needed to resolve a status of the species presently included in that genus. Currently *Mada* contains 43 described species (Szawaryn 2015a).

Malata Gordon 1975
(Figs. 13–15)

Malata Gordon 1975: 213. Type species: *Epilachna mitis* Mulsant 1850 (by original designation).—Jadwiszczak and Węgrzynowicz 2003: 204, Szawaryn et al. 2015: 558, 565.

Diagnosis. This genus resembles African genus *Figura* in having tarsal claws with the inner teeth touching one another and forming a cordate pattern. However, *Malata* can be distinguished from *Figura* by the mid and hind tibiae with oblique carina near apex, penis guide symmetrical, female genitalia with sperm duct, spermatheca and accessory gland present, and the coxites laterally not fused with paraprocts.

Description. Length 3.5–5.0 mm. Body oval (Fig. 14A), convex, dorsum pubescent. Elytra usually black or brown with lateral margin orange or reddish-brown, sometimes with two large yellow or piceous maculae covering most of the elytral surface.

Head (Fig. 13A). Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures about as long as half length of gula or shorter. Antenna (Fig. 13E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 about four times longer than broad; antennomeres 4–8 subquadrate or weakly elongate; club asymmetrical. Ventral antennal grooves long, straight, reaching distinctly beyond eyes; dorsal antennal grooves absent. Clypeus short, parallel-sided, its anterior margin straight, smooth without groove. Labrum (Fig. 13B) narrow, transverse, weakly emarginate. Mandible (Fig. 13C and D) multidentate apically; incisor edge without teeth, surfaces smooth, prostheca well developed. Maxilla (Fig. 13F) with cardo semicircular; maxillary stipes much longer than galea, with suture between basistipes and

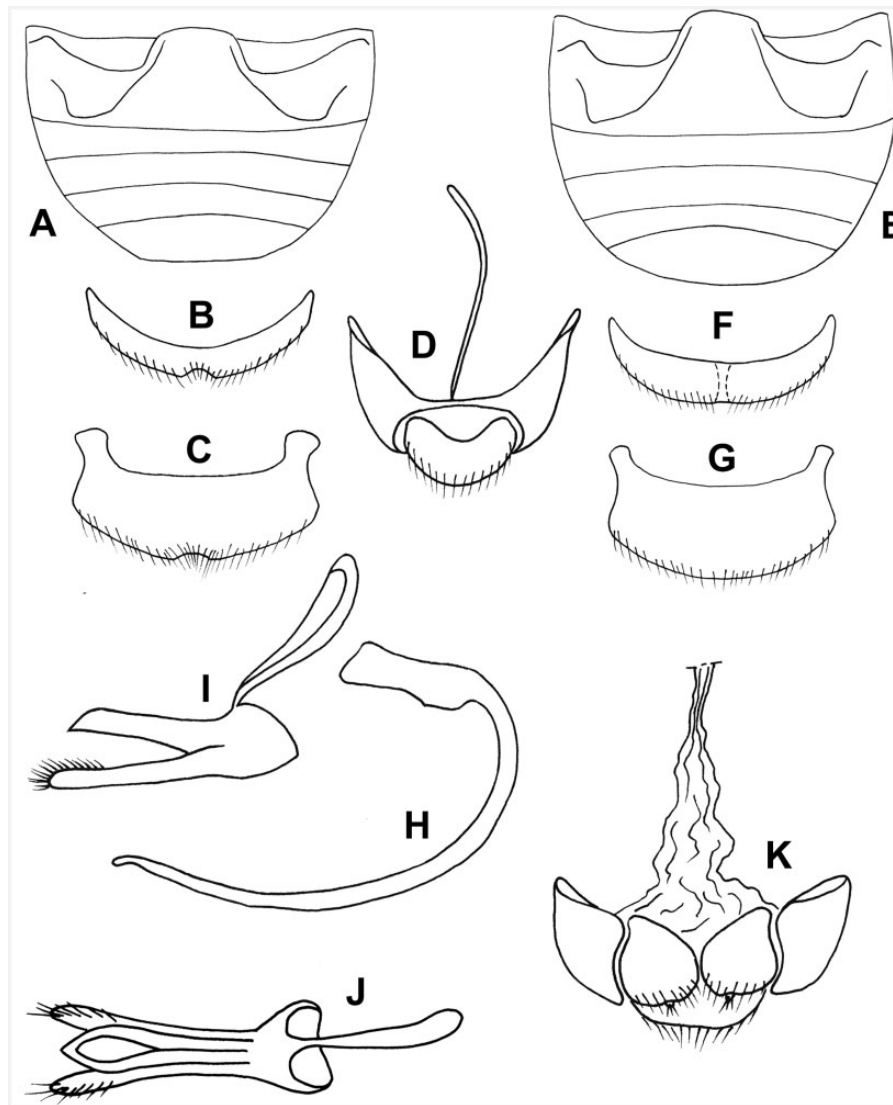


Fig. 12. *Mada synnemta* Gordon. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment, ventral; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

mediostipes partly visible; lacinia simple, its mesal surface simply setose; galea oval, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere elongate, broadened apically. Submentum transverse, about three times wider than long; mentum (Fig. 13G) at least two times broader than long, widest near base; prementum oval with emargination at apex, ligula shortly setose; labial palps (Fig. 13G) separated by distance about width of palpiger; apical palpomere distinctly shorter and narrower than penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 14D) smooth, without carinae, bordered laterally. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter, anterior margin uniformly arcuate (Fig. 14D). Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 14D-E) with anterior edge weakly emarginate, anterior border entirely raised; mesoventral process smooth; meso-metaventral suture straight or sinuate. Inner edge of metanepisternum smooth. Scutellum triangular, transverse. Elytra dually punctate, lateral margins at least narrow but entirely

visible from above. Epipleuron (Fig. 14A) incomplete apically, with foveae for receiving tips of femora, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines joined on metaventral process in weakly arcuate line, laterally complete, and distinctly recurved.

Legs (Fig. 14A) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters angulately produced. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 14.C). Tibiae without distinct spurs. Tarsal claws (Fig. 14B) double, weakly swollen at base, with inner claws broad, touching each other, forming heart shaped pattern.

Abdomen (Fig. 15A and E). Five ventrites in both sexes. Abdominal postcoxal lines recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 rounded (Fig. 15A); sternite VIII (Fig. 15B) narrowly but deeply emarginate; tergite VIII rounded (Fig. 15C); apodeme of sternum IX long, rod-like, simple (Fig. 15D). Tergite X transverse, rounded

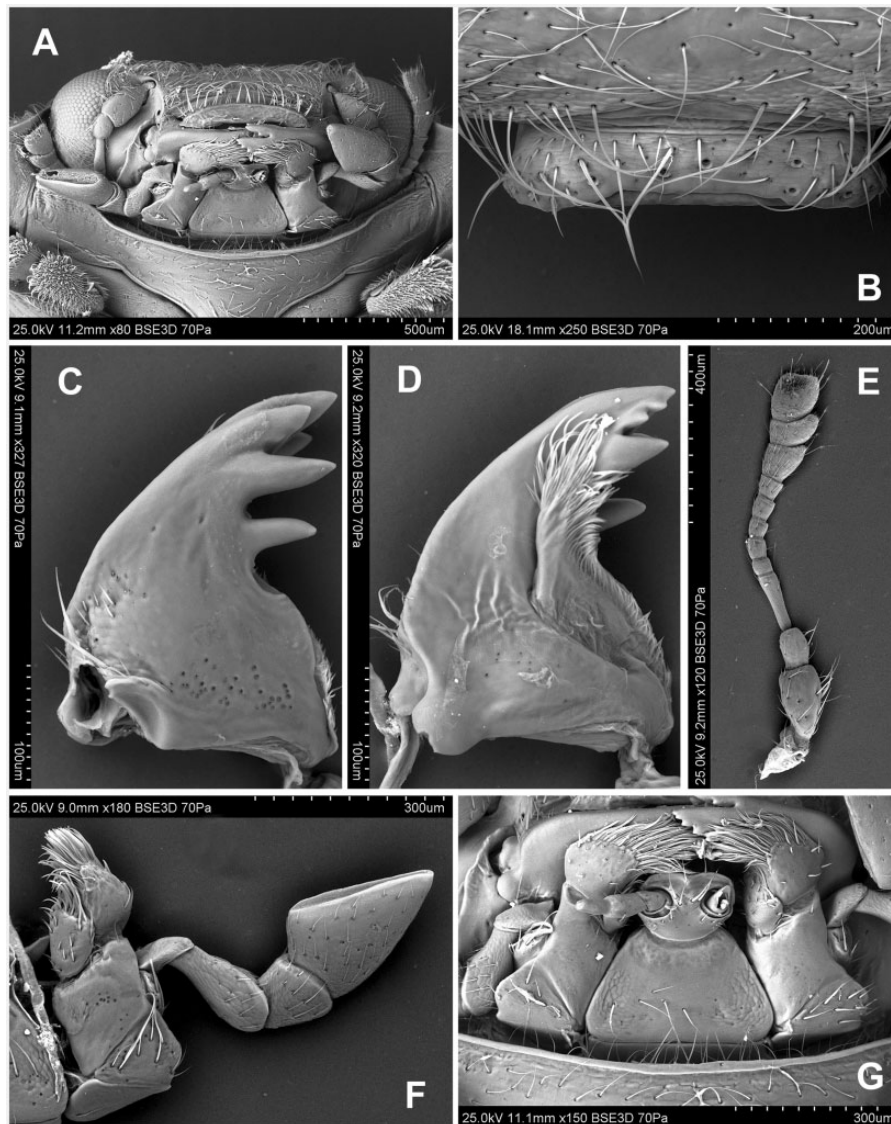


Fig. 13. *Malata mitis* (Mulsant). (A) Head, ventral view; (B) Clypeus and labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

apically. In female: apical margin of ventrite 5 (Fig. 15E) rounded apically; sternite VIII (Fig. 15F) rounded at apex and rounded at basal margin, longitudinally at middle not divided; tergite VIII (Fig. 15G) rounded. Proctiger (TX) membranous at basal part, sclerotized at apical part and rounded at apex.

Male genitalia (Fig. 15H–J). Tegminal basal piece without spines. Penis guide symmetrical, about as long as parameres, at apex entire; outer edge simple or with small, sharp tooth near apex; inner edge without additional process. Parameres well developed, simple apically, shortly pubescent in apical part. Penis rod-like, curved, simple with T-shaped capsule at base.

Female genitalia (Fig. 15K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, transversely oval; outer edge of coxite free, inner edge simple—rounded, ventral surface. Styli strongly reduced and hardly visible. Bursa copulatrix without sclerite, divided apically in two parts, dorsal part ending with common oviduct and ventral part ending with spermatheca. Sperm duct originated apically on bursa copulatrix.

Distribution. Central America: Costa Rica, Guatemala, Mexico, El Salvador.

Species included (examined). *Malata apatela* Gordon, *M. burgdorfi* Gordon, *M. delphinae* (Gorham), *M. diekei* Gordon, *M. mitis** (Mulsant).

Comment. We examined five of six species of *Malata* as listed in the catalogue of Jadwiszczak and Węgrzynowicz (2003).

Pseudodira Gordon 1975
(Figs. 16–18 and 82I)

Pseudodira Gordon 1975: 207. Type species: *Pseudodira clypealis* Gordon 1975 (by original designation).—Gordon and de Almeida 1986: 373, Jadwiszczak and Węgrzynowicz 2003: 207, Szawaryn et al. 2015: 557, 566, Szawaryn 2015b: 204 (redescription).

Diagnosis. *Pseudodira* is easily distinguished by having metaventral postcoxal lines joined on metaventral process in form of

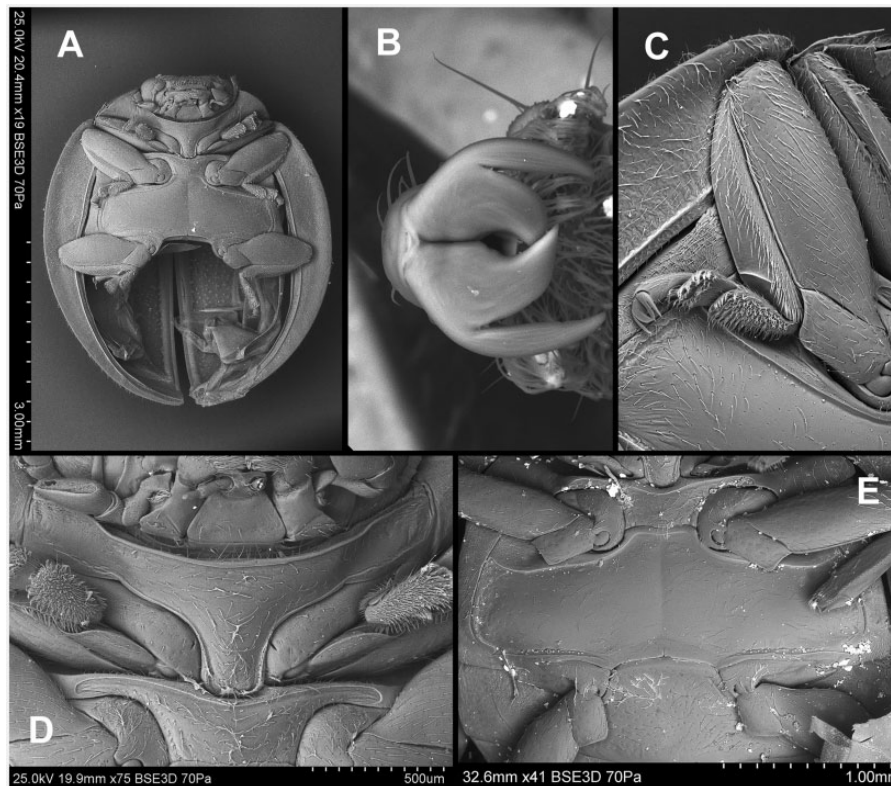


Fig. 14. *Malata mitis* (Mulsant). (A) Body, ventral view; (B) Tarsal claws; (C) Mid leg; (D) Prosternum and mesoventrite; (E) Meso- and metathorax, and abdominal ventrite 1.

strongly arcuate line and abdominal postcoxal lines only parallel to posterior margin of ventrite 1 or distinctly V-shaped.

Description. Length 5.8–7.5 mm. Body oval (Fig. 17A and 82I), strongly convex, dorsum pubescent. Elytra chestnut brown or black with greenish sheen.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 16A) shorter than half length of gula. Antenna (Fig. 16E) composed of 10 or 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomeres 4–7 very short, subquadrate or transverse; club asymmetrical. Ventral antennal grooves (Fig. 16A) short, straight, along inner margin of eye only. Dorsal antennal grooves absent. Clypeus parallel-sided, short, its anterior margin emarginate, smooth without groove. Labrum (Fig. 16B) moderately broad, transverse, anterior margin emarginate. Mandible (Fig. 16C–D) multidentate apically; incisor edge somewhat roundly produced inwards, multidentate, its surfaces smooth without tubercles, prosthema well developed. Maxilla (Fig. 16F) with cardo semicircular; maxillary stipes much longer than galea, with suture between basistipes and mediostipes visible; lacinia simple, its mesal surface simply setose; galea oval, about as long as wide, mostly sclerotized, its ventral surface at least sparsely pubescent; terminal palpomere securiform. Submentum transverse, about two times broader than long, with suture visible; mentum (Fig. 16G) less than two times broader than long, widest in middle part; prementum oval, ligula without setae; labial palps (Fig. 16G) separated by distance distinctly less than width of palpi; apical palpomere distinctly shorter and about as broad as penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 17D–E) without lateral carinae, sometimes with weak

tubercle at apex. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter, its anterior margin uniformly arcuate (Fig. 17G). Procoxal cavity with bordering line connecting laterally with anterior prosternal bordering line.

Pterothorax. Mesoventrite (Fig. 17E) with anterior edge slightly emarginate, anterior margin entirely raised; mesoventral process smooth or with tubercule; meso-metaventral suture emarginate. Inner edge of metanepisternum smooth. Scutellum triangular, about as long as broad. Elytra dually punctate, lateral margins narrow but entirely visible from above. Epipleuron (Fig. 17A) incomplete apically, with foveae for receiving tips of femora, its inner margin with bordering line nearly complete, fading before base of elytron. Anterior margin of metaventrite emarginate and distinctly bordered, border with distinct incisions in the anterior angles between the mid coxae. Metaventral postcoxal lines joined on metaventral process in strongly arcuate line (Fig. 17E), laterally complete and recurved.

Legs (Fig. 17A and D) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters angulately produced. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 17C). Tibial spurs: 1-2-2. Tarsal claws (Fig. 17B) double, swollen at base.

Abdomen (Fig. 18A). Five ventrites in females. Abdominal postcoxal lines (Fig. 18A) parallel to posterior margin of ventrite 1 or V-shaped, incomplete, without additional line; sternite VIII (Fig. 18C) emarginate at apex, with simple, arcuate basal margin, longitudinally at middle not divided; tergite VIII rounded (Fig. 18B). Proctiger (TX) truncate apically.

Female genitalia (Fig. 18D). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than

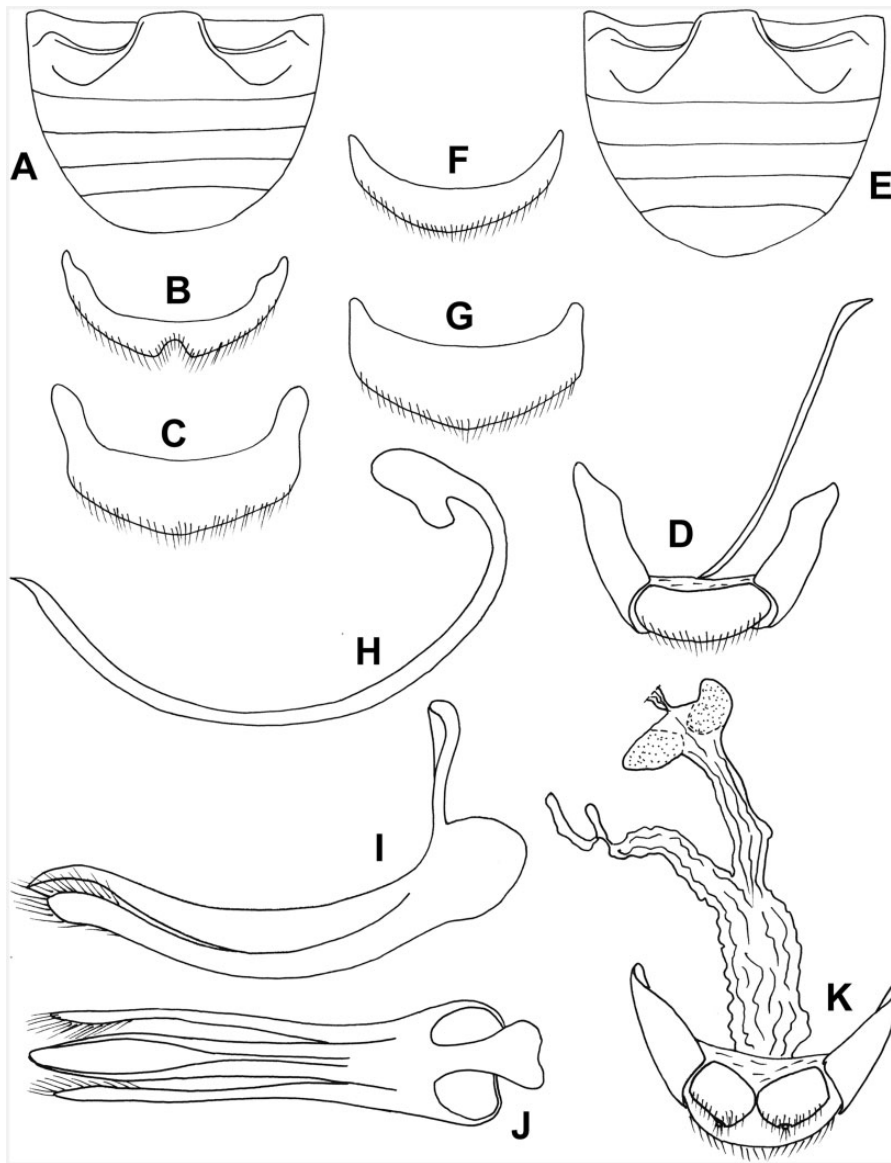


Fig. 15. *Malata mitis* (Mulsant). (A) Abdomen, male, ventral; (B) Abdominal sternite VIII 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment, ventral; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite 6, Female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

two times longer than wide, oval; outer edge of coxite free, inner edge rounded, ventral surface smooth. Styli present or absent. Bursa copulatrix without sclerite, simple, nondivided, ending with common oviduct. Sperm duct and spermatheca absent.

Male genitalia not studied (Gordon and de Almeida 1986).

Distribution. South America: Brazil, French Guinana, Peru.

Species included (studied). *Pseudodira amazona* Szawaryn, *P. carmelitana* (Mulsant), *P. clypealis** Gordon.

Comment. We studied all known species (according to the revision of the genus by Szawaryn 2015b).

Lorma Gordon 1975
(Figs. 19–21)

Lorma Gordon 1975: 207. Type species: *Lorma haliki* Gordon 1975 (by original designation)—Jadwiszczak and Węgrzynowicz 2003: 195, Szawaryn et al. 2015: 560, 565.

Diagnosis. *Lorma* is similar to *Pseudodira* in having tarsal claws double, smooth or swollen at base, mid and hind tibiae with oblique carina near their apices, apical tibial spurs present, gular sutures shorter than half length of gula and ventral antennal grooves short, extending along inner margin of eye only. *Lorma* however can be separated from *Pseudodira* by having metaventral postcoxal lines joined on metaventral process in form of straight or weakly arcuate line (strongly arcuate in *Pseudodira*), elytral epipleuron smooth without cavities for receiving tips of femora (cavities present in *Pseudodira*) and abdominal postcoxal lines recurved roundly (lines parallel to posterior margin of ventrite 1 or V-shaped in *Pseudodira*).

Description. Length 3.5–5.4 mm. Body oval (Fig. 20A), convex, dorsum pubescent. Elytra brown to black often with pale lateral margin and elytral suture, sometimes elytra with yellow spots.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures shorter than half length of gula. Antenna (Fig. 19E)

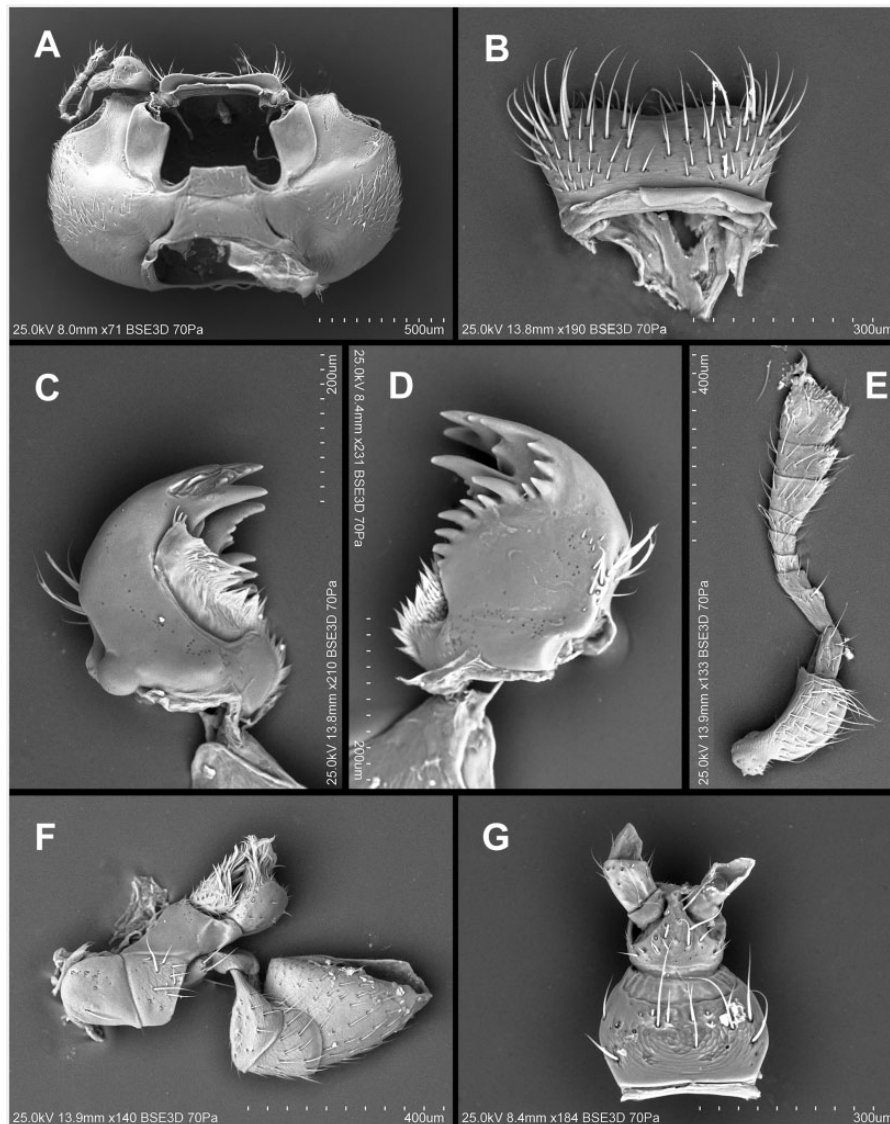


Fig. 16. *Pseudodira clypealis* Gordon. (A) Head, ventral view; (B) Labrum; (C) Mandible, ventral view; (D) Mandible, dorsal view; (E) Antenna; (F) Maxilla; (G) Labium.

composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 elongate, antennomeres 4–8 slightly elongate or subquadrate; club asymmetrical. Ventral antennal grooves (Fig. 19A) short, straight, along inner margin of eye only. Dorsal antennal grooves absent. Clypeus parallel-sided; its anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 19B) transverse, rounded at apex with apical part membranous. Mandible (Fig. 19C and D) multidentate apically; incisor edge multidentate, its surfaces smooth, prosthema well developed. Maxilla (Fig. 19A and 19F) with cardo quadrate to weakly transverse reaching at most slightly outside of mouth cavity; maxillary stipes much longer than galea, with suture between basistipes and mediostipes well visible; lacinia simple, its mesal surface simply setose; galea oval, as long as wide or weakly elongate, mostly sclerotized, its ventral surface at least sparsely pubescent; terminal palpomere elongate, broadened apically. Submentum short, transverse, suture weakly visible; mentum (Fig. 19G) less than two times broader than long, widest at base; prementum oval, ligula shortly setose; labial palps (Fig. 19G) separated by distance distinctly less

than width of palpiger; apical palpomere as long or longer and about as broad as penultimate palpomere.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 20D) smooth, without carinae, bordered laterally. Prosternum in front of coxa shorter than half length of coxal longitudinal diameter, anterior margin uniformly weakly arcuate. Procoxal cavity with bordering line reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 20E) with anterior edge emarginate, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture weakly emarginate. Inner margin of metanepisternum smooth. Scutellum triangular, at least as long as broad. Elytra dually punctate, lateral margins rather narrow but entirely visible from above. Epipleuron (Fig. 20A) incomplete apically, smooth, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines joined on metaventral process in straight or weakly arcuate line, laterally complete and distinctly recurved or straight.

Legs (Fig. 20A) stout with apices of mid and hind femora not protruding from outer margin of epipleuron. Fore and mid

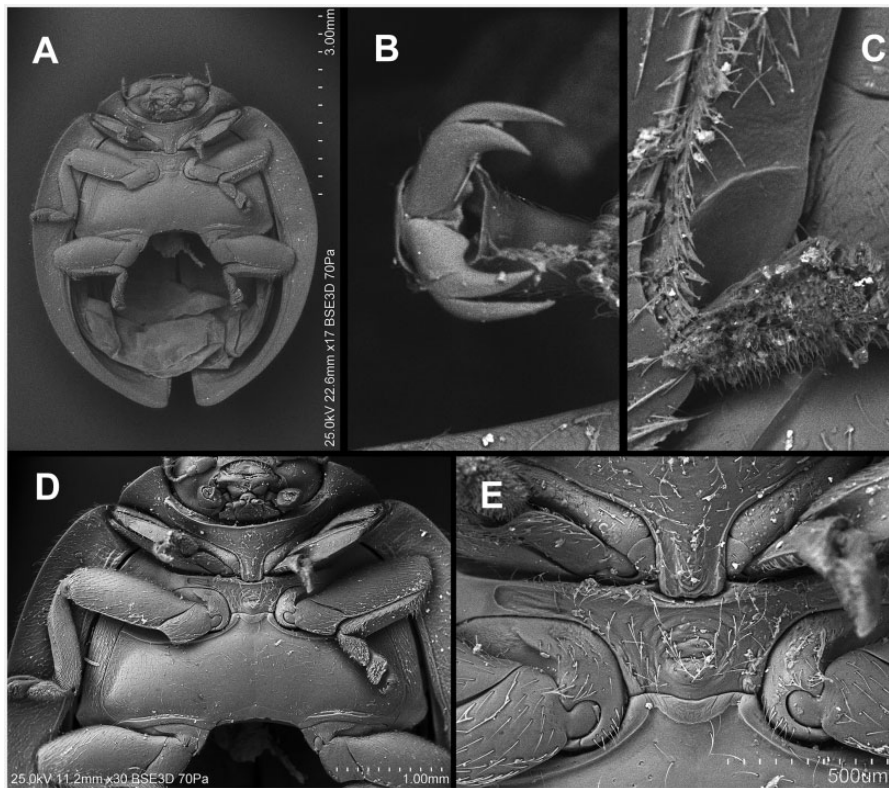


Fig. 17. *Pseudodira clypealis* Gordon. (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Head, pro-, meso- and metathorax, ventral; (E) Prosternal process, mesoventrite, and base of metaventrite.

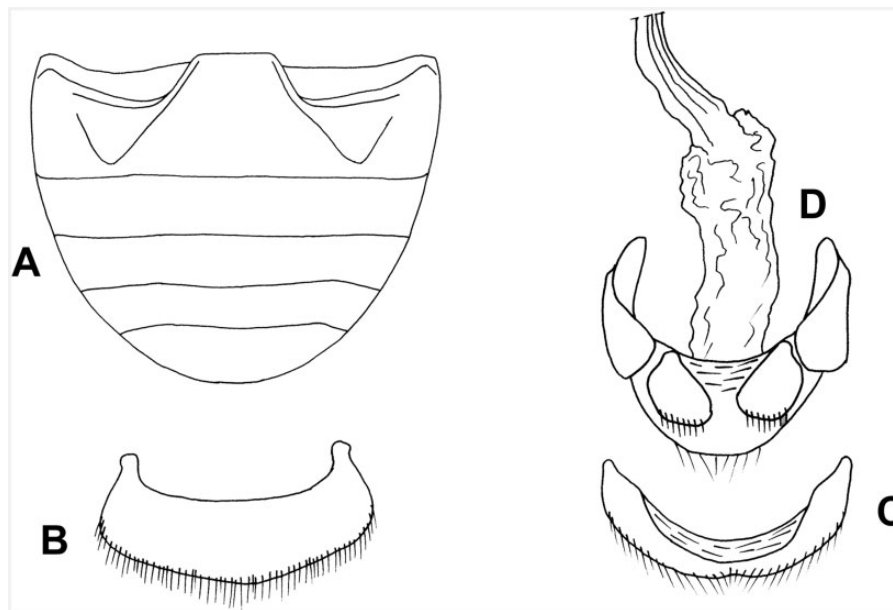


Fig. 18. *Pseudodira clypealis* Gordon. (A) Abdomen, female, ventral; (B) Abdominal tergite VIII, female, ventral; (C) Abdominal sternite VIII, female, ventral; (D) Female genitalia.

trochanters roundly or angulately produced with weak cavities on their inner surfaces for receiving tips of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 20C). Tibial spurs: 1-2-2. Tarsal claws (Fig. 20B) double, swollen at base.

Abdomen (Fig. 21A and E). Six ventrites in males and five ventrites in females. Abdominal postcoxal lines recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 21A); ventrite 6 emarginate (Fig. 21B); tergite VIII rounded (Fig. 21C); apodeme of sternum IX rod-like (Fig. 21D). Tergite X rounded. In female: apical margin of ventrite 5 gently

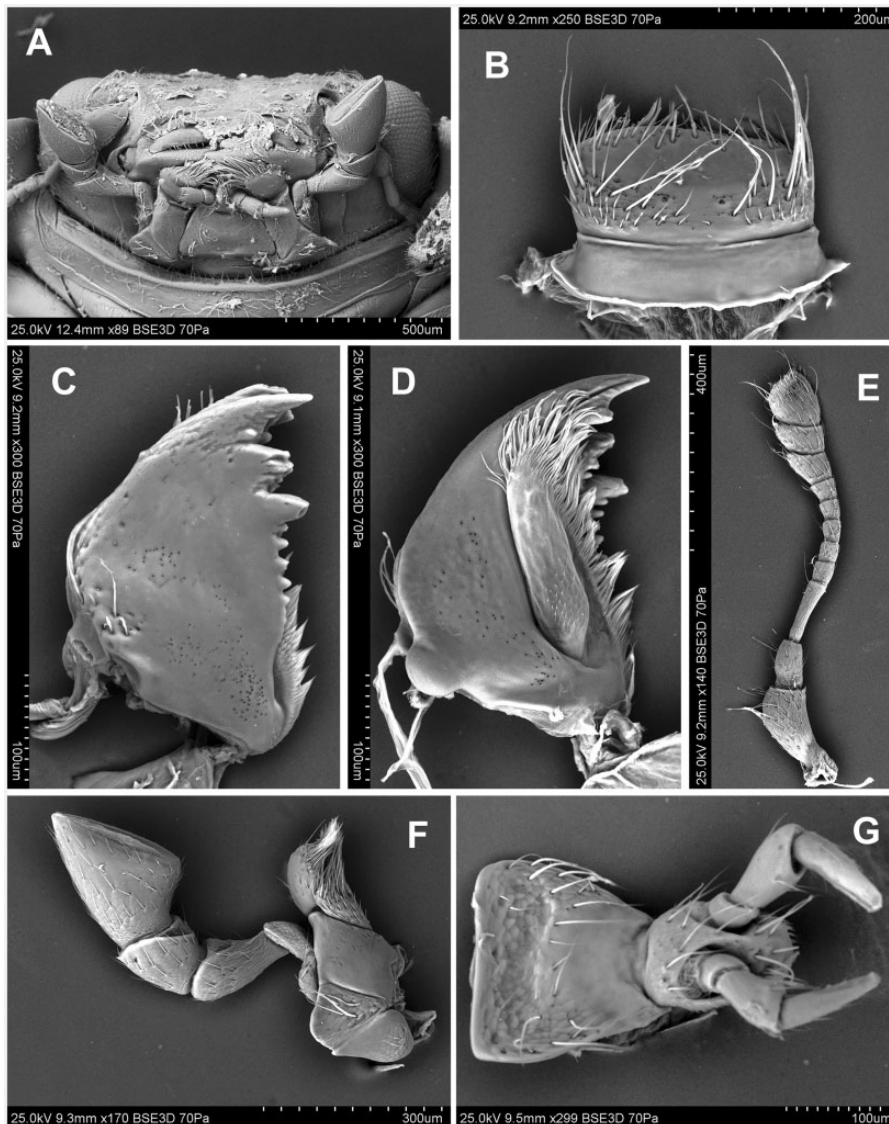


Fig. 19. *Lorma imitator* Gordon. (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

rounded (Fig. 21E); sternite VIII (Fig. 21F) emarginate at apex, with simple, arcuate basal margin, longitudinally at middle not divided; tergite VIII (Fig. 21G) rounded at apex. Proctiger (TX) rounded.

Male genitalia (Fig. 21H–J). Tegminal basal piece without spines. Penis guide symmetrical, slightly longer than parameres, at apex entire and pointed; outer edge smooth, inner edge without additional process. Parameres well developed, simple apically. Penis long, rod-like with reduced arms of basal capsule.

Female genitalia (Fig. 21K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, long oval; outer edge of coxite free, inner edge simple—rounded, ventral surface smooth. Styli absent. Bursa copulatrix without sclerite, simple, not divided, with common oviduct at apex. Sperm duct originated at dorsal side of bursa copulatrix.

Distribution. Central and South America: Bolivia, Brazil, Columbia, Costa Rica, Panama, Peru.

Species included (examined). *L. haliki* Gordon, *L. imitator* Gordon, *L. sopita* Gordon, *L. paprzyckii* Gordon, *L. specca* Gordon, *L. nevermanni* Gordon, *L. batesii* (Crotch).

Comment. We were able to study seven of 11 species of *Lorma*, according to [Jadwiszczak and Węgrzynowicz \(2003\)](#). As [Gordon \(1975\)](#) already mentioned, *Lorma batesii* (Crotch) does not fit well into any of the known genera due to its larger size and different structure of male genitalia. It is tentatively retained in *Lorma* pending further research.

Epilachna Chevrolat 1837
(Figs. 22–24 and 82D)

Epilachna Chevrolat in [Dejean 1837](#): 460. Type species, *Coccinella borealis* [Fabricius 1775](#) (by subsequent designation of [Hope 1840](#)).—*Epilachna* sensu stricto [Szawaryn et al. 2015](#): 561.

Diagnosis. *Epilachna* is closely related and morphologically most similar to *Toxotoma*. Apart from the similar body size and shape, both New World genera, share tarsal claws double smooth at base and mid, and hind tibiae without oblique carinae near their apices. *Epilachna*, however can be separated from *Toxotoma* by having

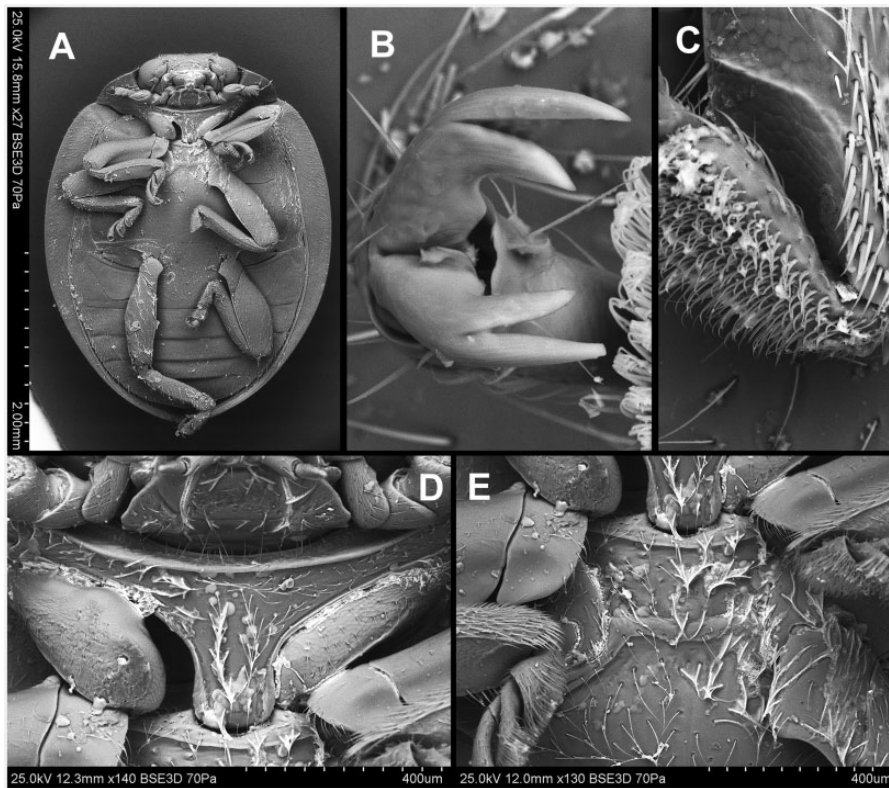


Fig. 20. *Lorma imitator* Gordon. (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Prosternum; (E) Meso-metaventral junction.

mandibular incisor edge multidentate with its surfaces most often tuberculate, metaventral postcoxal lines descending and continuing as lateral bordering of metaventrite (rarely descending and complete), fore tibia with single spur and abdominal postcoxal lines always well developed.

Description. Length 7.0–12.0 mm. Body (Fig. 23A and 82D) round oval to weakly elongate oval, strongly convex, pubescent. Variable in coloration.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Gular sutures (Fig. 22A) at least as long as half length of gula. Antenna (Fig. 22E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomeres 6 and 7 quadrate or weakly elongate; two subterminal antennomeres asymmetrical. Ventral and dorsal antennal grooves absent (Fig. 22A). Clypeus parallel-sided, its anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 22B) transverse, weakly emarginate at apex with apical part membranous. Mandible (Fig. 22C–D) multidentate apically; incisor edge multidentate, its surfaces densely tuberculate, rarely smooth. Maxilla (Fig. 22F) with cardo quadrate to weakly transverse reaching at most slightly outside of mouth cavity; maxillary stipes much longer than galea, in form of single sclerite with at most weak trace of suture visible, rarely with suture between basistipes and mediostipes at least partly well visible; lacinia simple, its mesal surface simply setose; galea as long as wide or weakly elongate, mostly sclerotized, its ventral surface at least sparsely pubescent; terminal palpomere elongate, broadened apically or sometimes distinctly securiform. Mentum (Fig. 22G) usually less than two times broader than long, rarely more than two times broader than long, widest near base; prementum oval, ligula shortly setose or sometimes covered with

long setae; labial palps (Fig. 22G) separated by distance distinctly less than width of palpiger; apical palpomere at least as long and as broad as penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 23D) smooth, without carinae. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter, its anterior margin continuing as arcuate line. Procoxal cavity with bordering line, reaching laterally notosternal suture, rarely without visible bordering line.

Pterothorax. Mesoventrite with anterior edge emarginate (Fig. 23D), anterior margin entirely raised; mesoventral process (Fig. 23E) smooth; meso-metaventral suture straight or weakly emarginate. Inner margin of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite with tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins narrow or moderately broad, entirely visible from above, sometimes distinctly explanate in basal half. Epipleuron (Fig. 23A) smooth, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines (Fig. 23E) joined on metaventral process in straight or weakly arcuate line, laterally descending and continuing as lateral bordering of metaventrite or postcoxal lines rarely descending and complete.

Legs (Fig. 23A) rather stout with apices of mid and hind femora not protruding from outer margin of epipleuron. Fore and mid trochanters roundly or angulately produced, with weak cavities on their inner surfaces for receiving tips of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge without carina (Fig. 23C). Tibial spurs: 1-2-2. Tarsal claws (Fig. 23B) double, smooth at base.

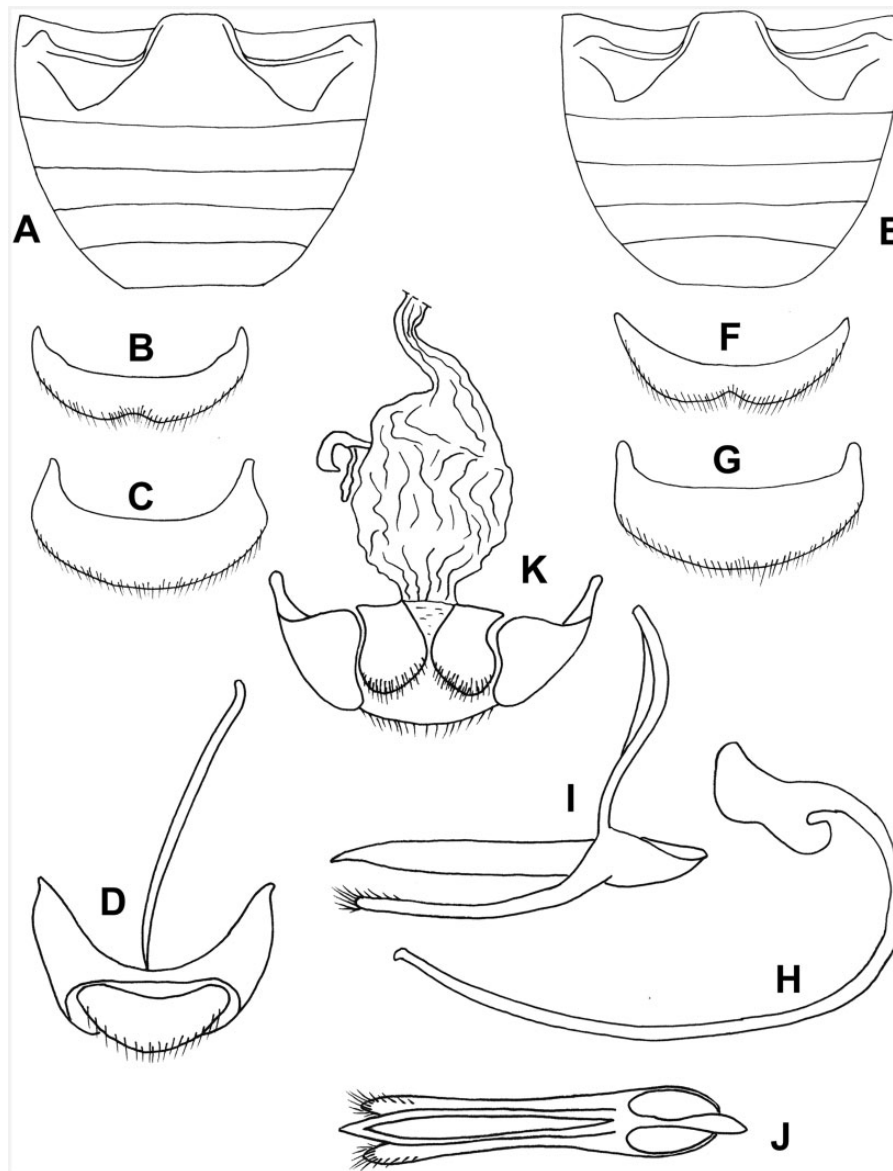


Fig. 21. *Lorma imitator* Gordon. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Abdomen (Fig. 24A and E). Six ventrites in males and five ventrites in females. Abdominal postcoxal lines recurved roundly but incomplete laterally or rarely complete, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 24A); ventrite 6 emarginate (Fig. 24B); tergite VIII (Fig. 24C) truncate or emarginate apically, sometimes rounded; apodeme of sternum IX rod-like (Fig. 24D). Tergite X rounded or truncate. In female: apical margin of ventrite 5 (Fig. 24E) somewhat triangularly produced medially; sternite VIII (Fig. 24F) narrowly emarginate or truncate at apex, with simple, arcuate basal margin, longitudinally at middle not divided or looking like divided but connected by membrane; tergite VIII (Fig. 24G) rounded, truncate or emarginate at apex. Proctiger (TX) with posterior margin rounded or truncate to weakly emarginate.

Male genitalia (Fig. 24H–J). Tegminal basal piece without spines. Penis guide symmetrical, slightly longer or shorter than parameres, at apex entire and pointed; outer edge smooth; inner edge

without additional process. Parameres well developed, simple apically. Penis long, curved at base then straight and sometimes curved in opposite side near apex (resembling question mark in shape), basal capsule with arms reduced.

Female genitalia (Fig. 24K). Sclerite anteriorly to coxites in membrane connected paraprocts absent. Coxites distinctly less than two times longer than wide, oval; outer edge of coxite free, inner edge simple—straight, rounded, or weakly emarginate, ventral surface smooth. Styli distinct or sometimes strongly reduced and hardly visible. Bursa copulatrix without sclerite, divided in two parts, dorsal ending with common oviduct and ventral ending with sperm duct and spermatheca; sperm duct originated sometimes dorsally on bursa copulatrix.

Distribution. North, Central and South America: Argentina, Belize, Bolivia, Brazil, Chile, Ecuador, Guiana, French Guiana, Guatemala, Honduras, Colombia, Costa Rica, Mexico, Nicaragua,

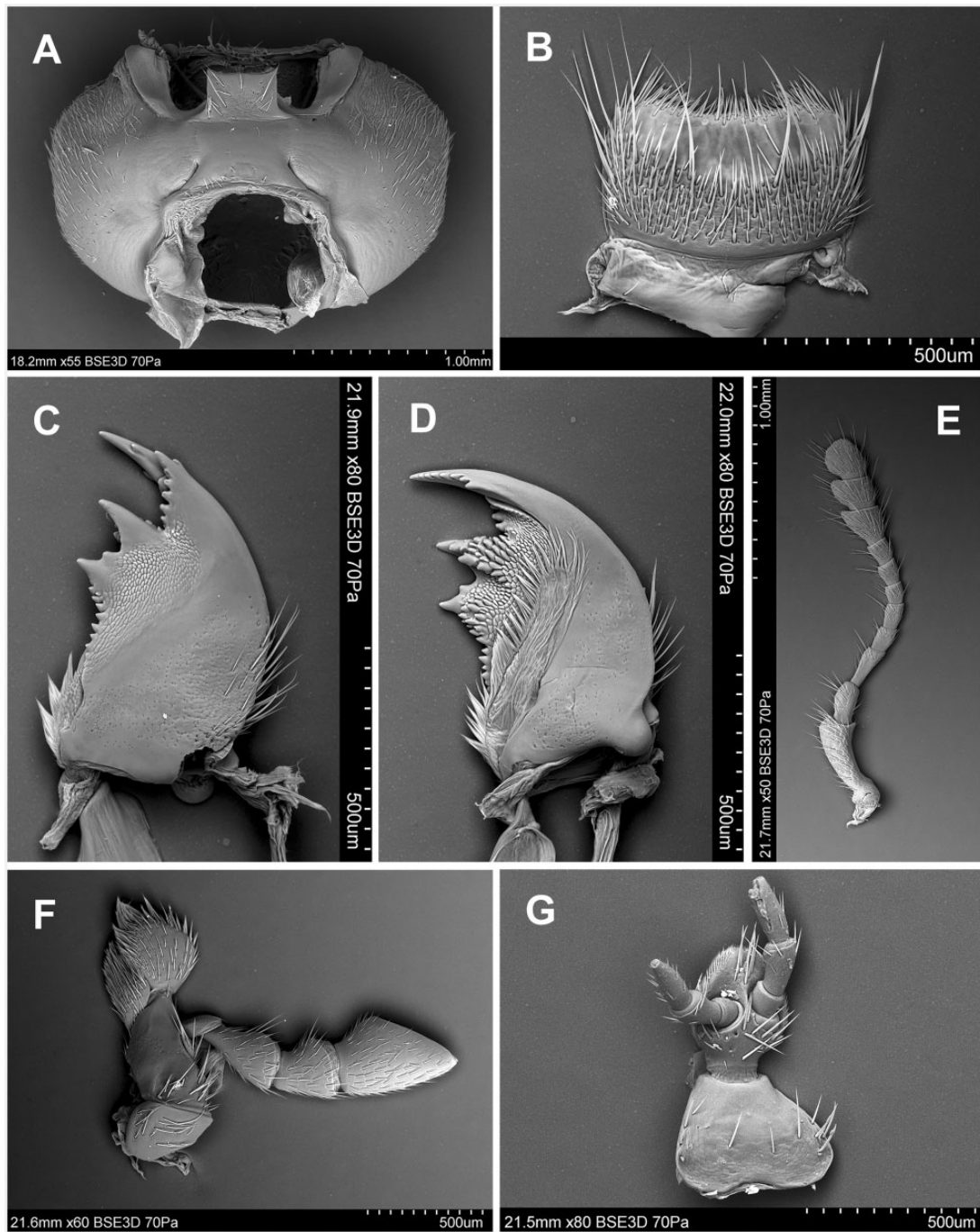


Fig. 22. *Epilachna borealis* (Fabricius). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

Panama, Paraguay, Peru, United States of America, Salvador, Surinam, Uruguay, Venezuela.

Species included (examined): *Epilachna borealis** Chevrolat, *E. boraustralis* Gordon, *E. cacica* (Guérin-Méneville), *E. extrema* Crotch, *E. mexicana* (Guérin-Méneville), *E. mutabilis* Crotch, *E. nigrocincta* Mulsant, *E. olivacea* Mulsant, *E. praecipua* Gordon, *E. tumida* Gorham.

Comment. Studied species belonged to eight species groups of 34 groups recognized by Gordon (1975)—*Epilachna borealis* group, *E. axillaris* group, *E. mutabilis* group, *E. mexicana* group, *E. plagiata* group, *E. nigrocincta* group, *E. olivacea* group, and *E. cacica* group.

It is probable that all remaining species from these groups will belong to *Epilachna*.

Toxotoma Weise 1900
(Figs. 25–27 and 83G)

Toxotoma Weise 1900a: 257. Type species: *Epilachna venusta* Erichson 1847 (by original designation).—Gordon 1975: 18, Szawaryn et al. 2015: 554, 561, 566.

Epilachna Chevrolat in Dejean 1837 (in part).—Szawaryn et al. 2015: 554, 561, 566.

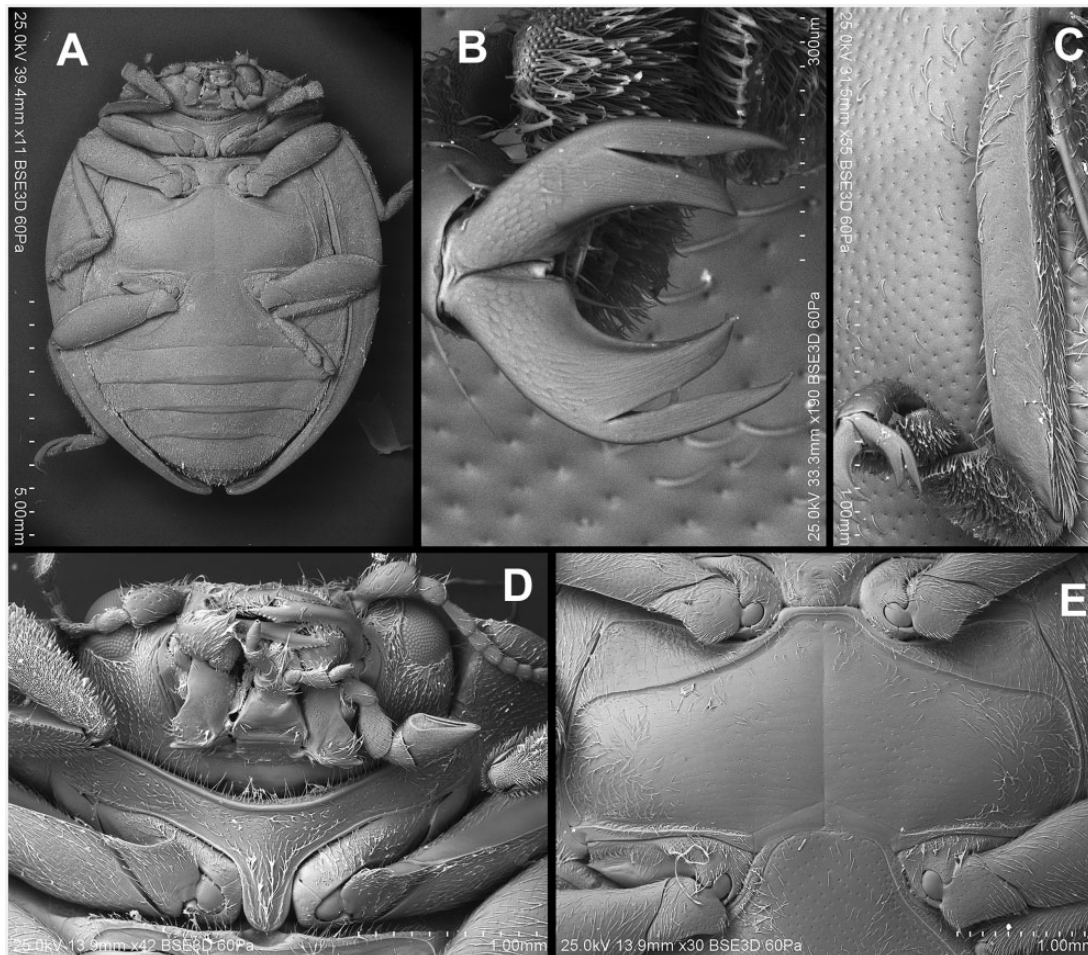


Fig. 23. *Epilachna borealis* (Fabricius). (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia; (D) Head and prothorax, ventral; (E) Meso- and metaventrite.

Diagnosis. Among New World Epilachnini, *Toxotoma* is most similar to *Epilachna* by body size and shape, sharing the following combination of characters: tarsal claws double, smooth at base, and mid, and hind tibiae without oblique carina near their apices. *Toxotoma* can be separated from *Epilachna* by having mandibular incisor edge smooth with its surfaces lacking tubercles, the metaventral postcoxal lines recurved or straight, or rarely descending and always complete, and abdominal postcoxal lines sometimes reduced and hardly visible.

Description. Length 5.0–13.5 mm. Body (Fig. 26A and 83G) oval to elongate oval, strongly convex, pubescent, most often black with elytra covered with yellow or orange spots, bands or stripes.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Gular sutures (Fig. 25A) at least as long as half length of gula. Antenna (Fig. 25E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 6 quadrate or weakly elongate, sometimes very short, transverse or rarely at least 1.5 longer than broad; antennomere 7 very short, transverse or sometimes subquadrate; two subterminal antennomeres asymmetrical. Ventral antennal grooves absent (Fig. 25A), rarely present short, straight, along inner margin of eye only. Dorsal antennal grooves absent. Clypeus parallel-sided, its anterior margin smooth without groove, straight or weakly emarginate. Labrum (Fig. 25B) transverse, weakly emarginate to sinuate at apex with apical part membranous. Mandible (Fig. 25C and D) multidentate apically; incisor edge

without teeth, its surfaces smooth. Maxilla (Fig. 25F) with cardo suquadrate reaching at most slightly outside of mouth cavity; maxillary stipes much longer than galea, suture between basistipes, and mediostipes at least partly well visible; lacinia simple, its mesal surface simply setose; galea about as long as wide or rarely transversely oval, mostly sclerotized, its ventral surface at least sparsely pubescent; terminal palpomere variable, distinctly securiform, or at least weakly elongate, parallel-sided to weakly expanded apically, or elongate and broadened apically. Mentum (Fig. 15G) less than two times broader than long, widest near base; prementum oval, ligula shortly setose or sometimes covered with long setae; labial palps (Fig. 25G) separated by distance distinctly less than width of palpiger; apical palpomere at least as long and about as broad as penultimate one.

Prothorax. Hypomerion simply/finely punctate. Prosternal process (Fig. 26D) smooth, without carinae. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter, its anterior margin arcuate or triangularly produced anteriorly at middle. Procoxal cavity with bordering line, reaching laterally notosternal suture or without visible bordering line.

Pterothorax. Mesoventral process (Fig. 26D) smooth or carinate and/or tuberculate; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite with tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctatae; lateral margins narrow or moderately broad, entirely visible from

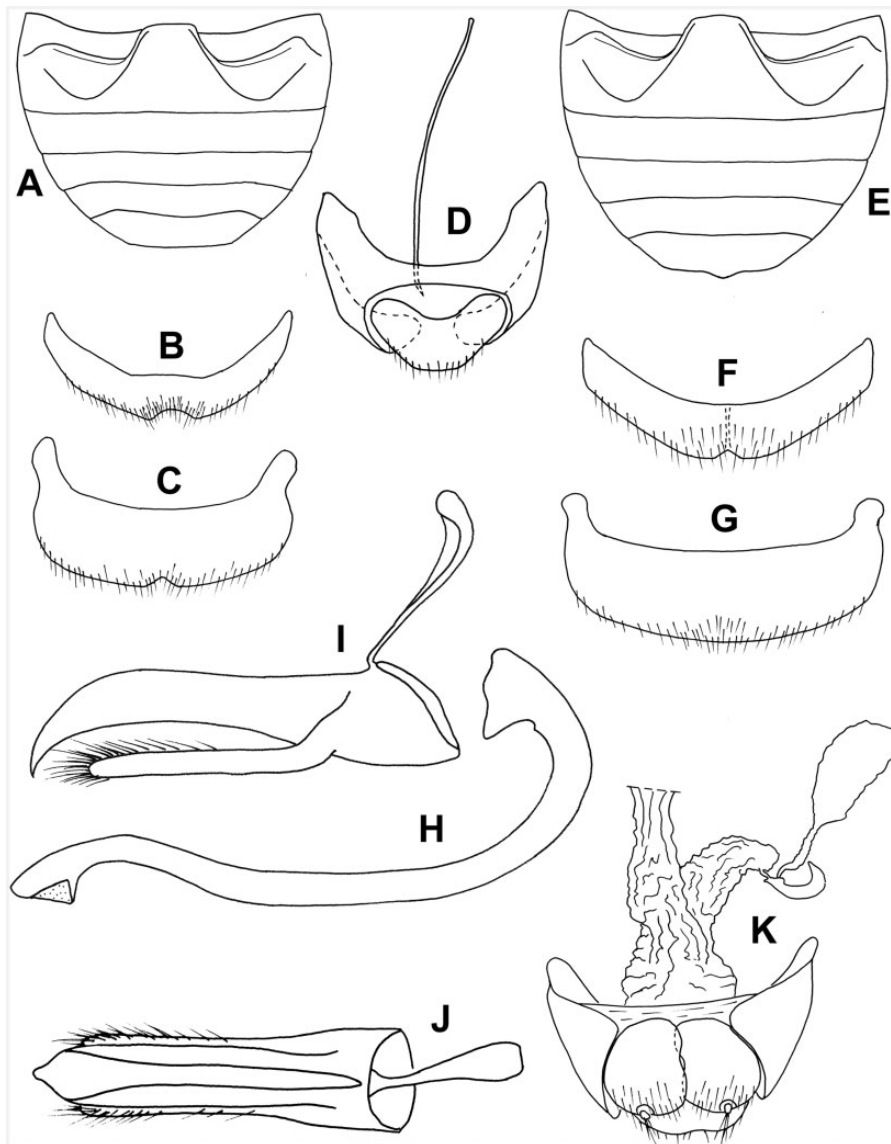


Fig. 24. *Epilachna borealis* (Fabricius). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal ventrite 6, female; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

above, sometimes distinctly explanate in basal half. Epipleuron (Fig. 26A) smooth, inner margin with bordering line nearly complete, fading before base of elytron or sometimes extending at most to level of mid coxa. Metaventral postcoxal lines (Fig. 26D) joined on metaventral process in straight or weakly arcuate line, laterally complete, and distinctly recurved or straight, rarely descending.

Legs (Fig. 26A and E) slender or moderately stout with apices of mid and hind femora often protruding from outer margin of epipleuron. Fore and mid trochanters simple, sometimes roundly or angulately produced. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge without carina (Fig. 26C). Tibial spurs: 0/1/2-2-2. Tarsal claws (Fig. 26B) double, smooth at base.

Abdomen (Figs. 26A, 27A and E). Six ventrites in males and five or six ventrites in females. Abdominal postcoxal lines recurved roundly, complete or incomplete laterally, without additional line, sometimes abdominal postcoxal lines reduced and hardly visible. In

male: apical margin of ventrite 5 truncate to weakly emarginate (Fig. 27A); ventrite 6 emarginate (Fig. 27B); tergite VIII rounded, truncate or emarginate apically, sometimes distinctly excised medially at apex (Fig. 27C); apodeme of sternum IX rod-like (Fig. 27D). Tergite X rounded or truncate. In female: apical margin of ventrite 5 triangularly produced medially, subtruncate or narrowly emarginate (Fig. 27E); ventrite 6 narrowly emarginate or truncate at apex, sometimes excised with (Fig. 27F) or without additional median projection, basal margin arcuate, longitudinally at middle not divided or looking like divided but connected by membrane, rarely fully or almost divided along middle; tergite VIII rounded, truncate or emarginate (Fig. 27G), or sometimes distinctly excised medially at apex. Proctiger (TX) with posterior margin simple, rounded or truncate to weakly emarginate.

Male genitalia (Fig. 27H-J). Tegminal basal piece without spines. Penis guide symmetrical, slightly longer or shorter than parameres, at apex entire, pointed, often curved outwardly, sometimes

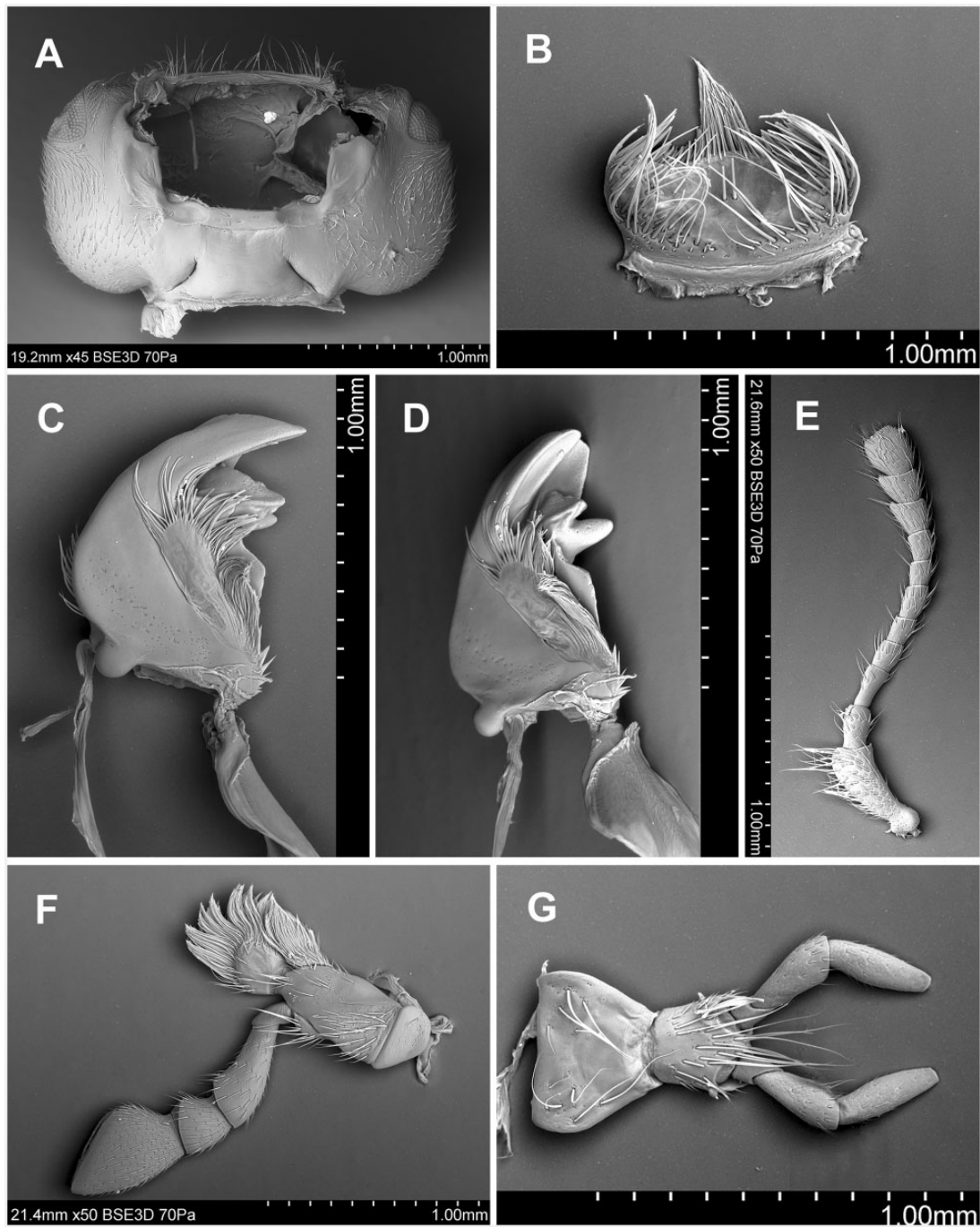


Fig. 25. *Toxotoma andicola* Weise. (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

penis guide divided near apex in two parts (inner shorter and outer longer, e.g. in *T. satipennis*); outer edge smooth; inner edge without additional process. Parameres well developed, simple apically. Penis moderately long and stout, rather weakly curved, arms of basal capsule reduced.

Female genitalia (Fig. 27K). Sclerite anteriorly to coxites in membrane connected paraprocts absent. Coxites distinctly less than two times longer than wide, oval; outer edge of coxite free, inner edge simple—straight, rounded or weakly emarginate, ventral surface smooth. Styli present or absent, sometimes strongly reduced and hardly visible. Bursa copulatrix without sclerite. Sperm duct originated dorsally or sometimes apically on bursa copulatrix.

Distribution. South America: Argentina, Bolivia, Brazil, Ecuador, Colombia, Peru, Uruguay, Venezuela.

Species included (examined): *Toxotoma aequatorialis* (Gordon) comb. nov., *T. bizonata* (Crotch) comb. nov., *T. convergens* (Crotch) comb. nov., *T. cruciata* (Mulsant) comb. nov., *T. dubia* (Crotch) comb. nov., *T. flavofasciata* (Laporte) comb. nov., *T. monovittata* (Gordon) comb. nov., *T. orthostriata* (Gordon) comb. nov., *T. paracuta* (Gordon) comb. nov., *T. patricia* (Mulsant) comb. nov., *T. satipennis* (Gordon) comb. nov., *T. univittata* (Crotch) comb. nov., *T. andicola* Weise, *T. haywardi* Gordon, *T. forsteri* Mader, *T. cuzcoensis* Gordon, *T. pilifera* (Weise), *T. pulchra* (Weise).

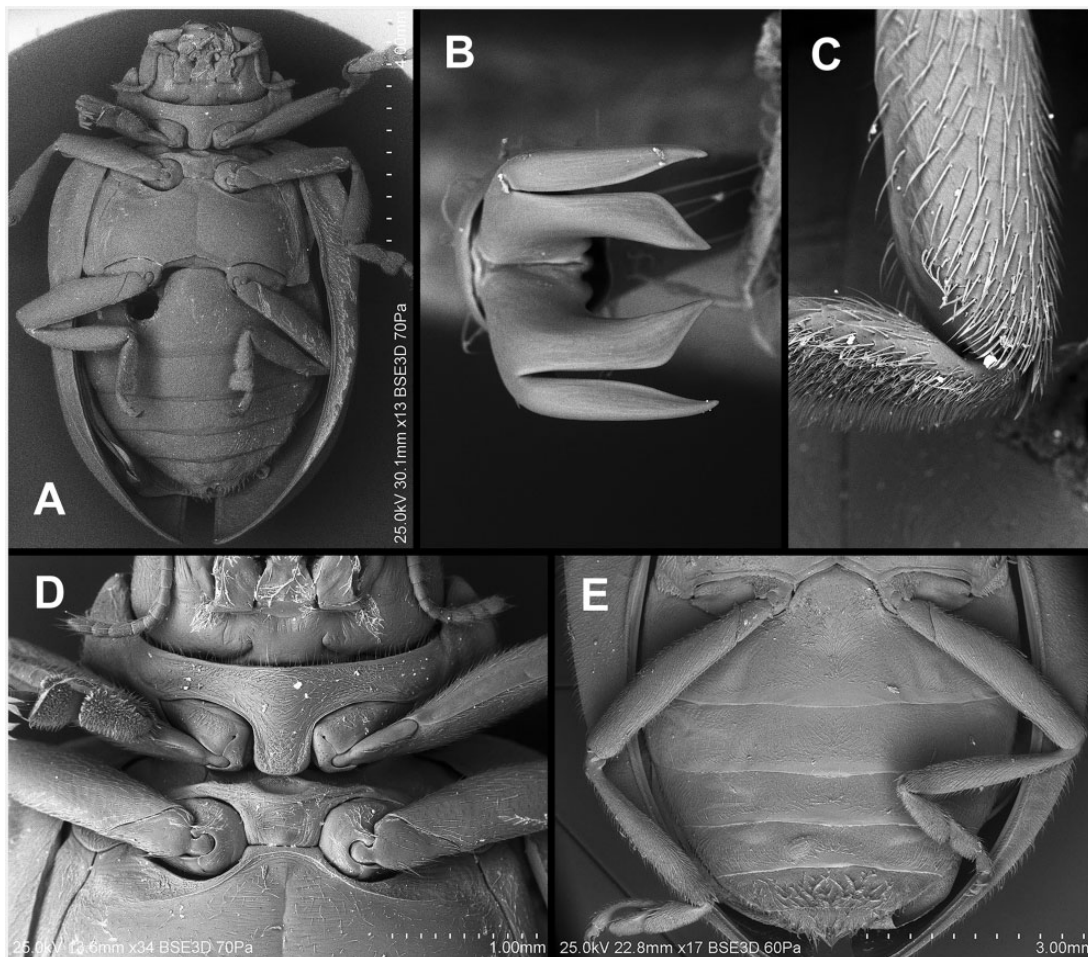


Fig. 26. *Toxotoma cuzcoensis* Gordon. (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Pro-, meso-, and metathorax, ventral; (E) Abdomen, male, ventral.

Comment. Studied species belonged to the genus *Toxotoma* and to eight species groups of 34 groups of former *Epilachna* recognized by Gordon (1975)—*Epilachna flavofasciata* group, *E. v-pallidum* group, *E. cruciata* group, *E. patricia* group, *E. vittigera* group, *E. approximata* group, *E. angustata* group, and *E. satipennis* group. It is therefore probable that all remaining species from these species groups of former *Epilachna* and remaining, unstudied species of *Toxotoma* will belong to *Toxotoma* in the present sense.

Apart from named/determined species, an unnamed species of former *Epilachna* from Ecuador was examined (voucher specimens used in Szawaryn et al. 2015: *E.sp_KS194*).

Megatela Weise 1906 (Figs. 28–30)

Megatela Weise 1906: 159. Type species: *Megatela erotyloides* Weise 1906 (by monotypy). Jadwiszczak and Węgrzynowicz 2003: 205, Szawaryn et al. 2015: 544, 565.

Diagnosis. *Megatela* can be easily distinguished from other Epilachnini by having large, convex eyes with inner orbits being closer together near mouthparts than near vertex, frons with distinct depression between eyes, dorsal antennal grooves on the head, antennae with very long scape (about 1/3 of total length of antenna),

and mid and hind femora angulately produced posteriorly on inner edge.

Description. Length 4.2–4.6 mm. Body (Fig. 29A) elongate oval, convex, dorsum pubescent, brown.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest anteriorly (Fig. 28A). Frons with distinct depression between eyes. Gular sutures shorter than half length of gula. Antenna (Fig. 28E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel longer than antennomeres 3–8 combined, and as broad as scape; antennomeres 6–8 very short, transverse; club large, broad, symmetrical. Ventral antennal grooves absent. Dorsal antennal grooves (Fig. 28A) present, deep. Clypeus moderately long, trapezoidal, its anterior margin weakly emarginate, smooth and simple. Labrum (Fig. 28B) strongly transverse, broadly emarginate. Mandible (Fig. 28C–D) multidentate apically; incisor edge provided with large subtriangular blunt teeth, its dorsal and ventral surfaces smooth; prostheca well developed. Maxilla (Fig. 28F) with cardo semicircular, not reaching outside of mouth cavity; maxillary stipes much longer than galea with suture between basistipes and mediostipes partly well visible; galea about as long as wide, subtriangular in shape, mostly sclerotized; lacinia small, simple with mesal surface simply setose, its ventral surface sparsely pubescent; terminal palpomere weakly elongate. Submentum transverse, about three times wider than long, suture well visible;

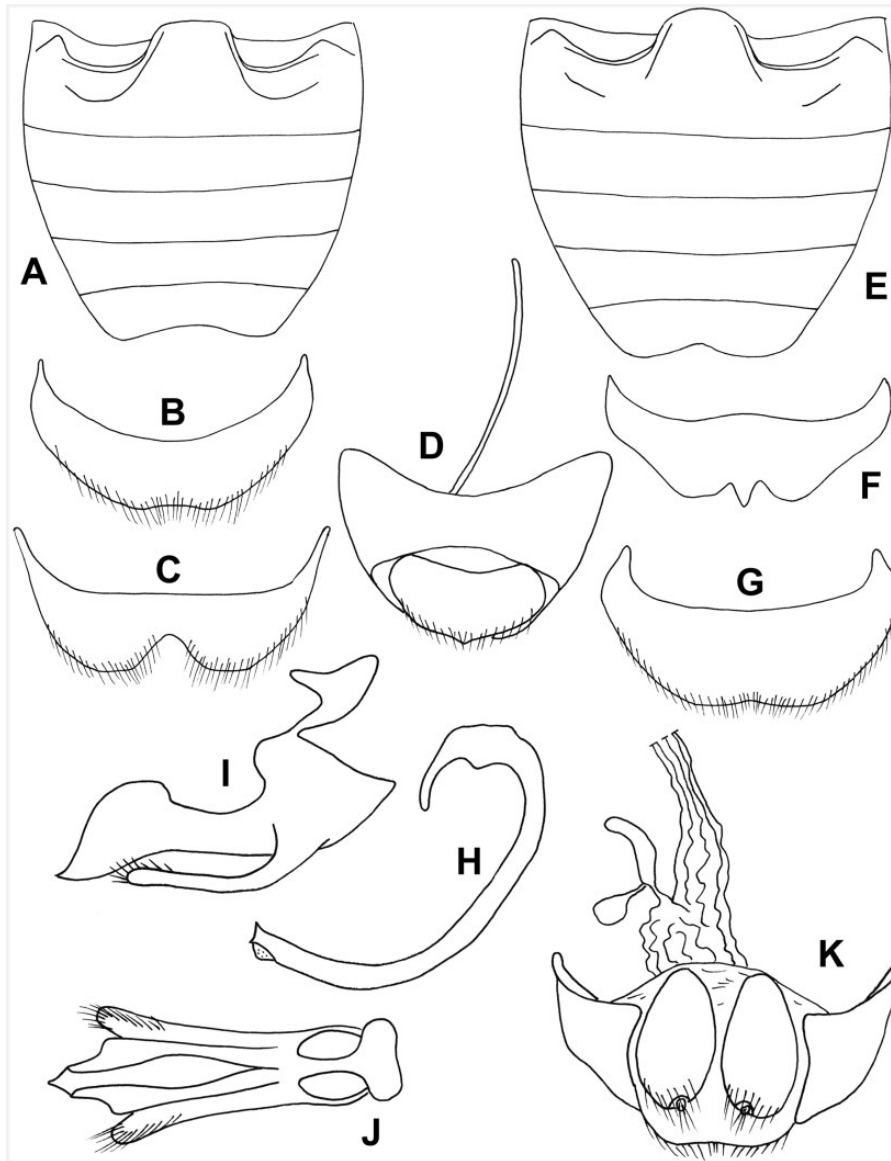


Fig. 27. *Toxotoma cuzcoensis* Gordon. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment, ventral; (E) Abdomen, female, ventral; (F) Abdominal ventrite 6, female; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

mentum (Fig. 28G) transverse, less than two times broader than long, widest near base; prementum suboval, emarginate anteriorly, produced antero-laterally, its dorsal surface covered with sclerotized tubercles anteriorly, ligula indistinct; labial palps (Fig. 28G) separated by distance distinctly less than width of palpiger; apical palpmere shorter and narrower than penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 29D) with surface smooth, distinctly bordered laterally. Prosternum in front of coxa, much shorter than half length of coxal longitudinal diameter, its anterior margin uniformly arcuate. Procoxal cavity without visible bordering line.

Pterothorax. Mesoventrite (Fig. 29D–E) with anterior edge straight, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, as long as broad. Metendosternite with tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral

margins moderately wide, entirely visible from above. Epipleuron (Fig. 29A) complete, smooth, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines (Fig. 29E) joined on metaventral process in straight line, descending laterally and continuing as lateral bordering of metaventrite.

Legs (Fig. 29A) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters roundly produced with weak cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxa simple; mid and hind femora swollen, on inner edge in median part angulately produced posteriorly (Fig. 29E); mid and hind tibiae on outer edge near apex without carina (Fig. 29C). Tibiae without spurs. Tarsal claws (Fig. 29B) double with large basal tooth.

Abdomen (Fig. 30A and E). Five ventrites in males and six in females. Abdominal postcoxal lines recurved roundly but incomplete laterally. In male: apical margin of ventrite 5 rounded to

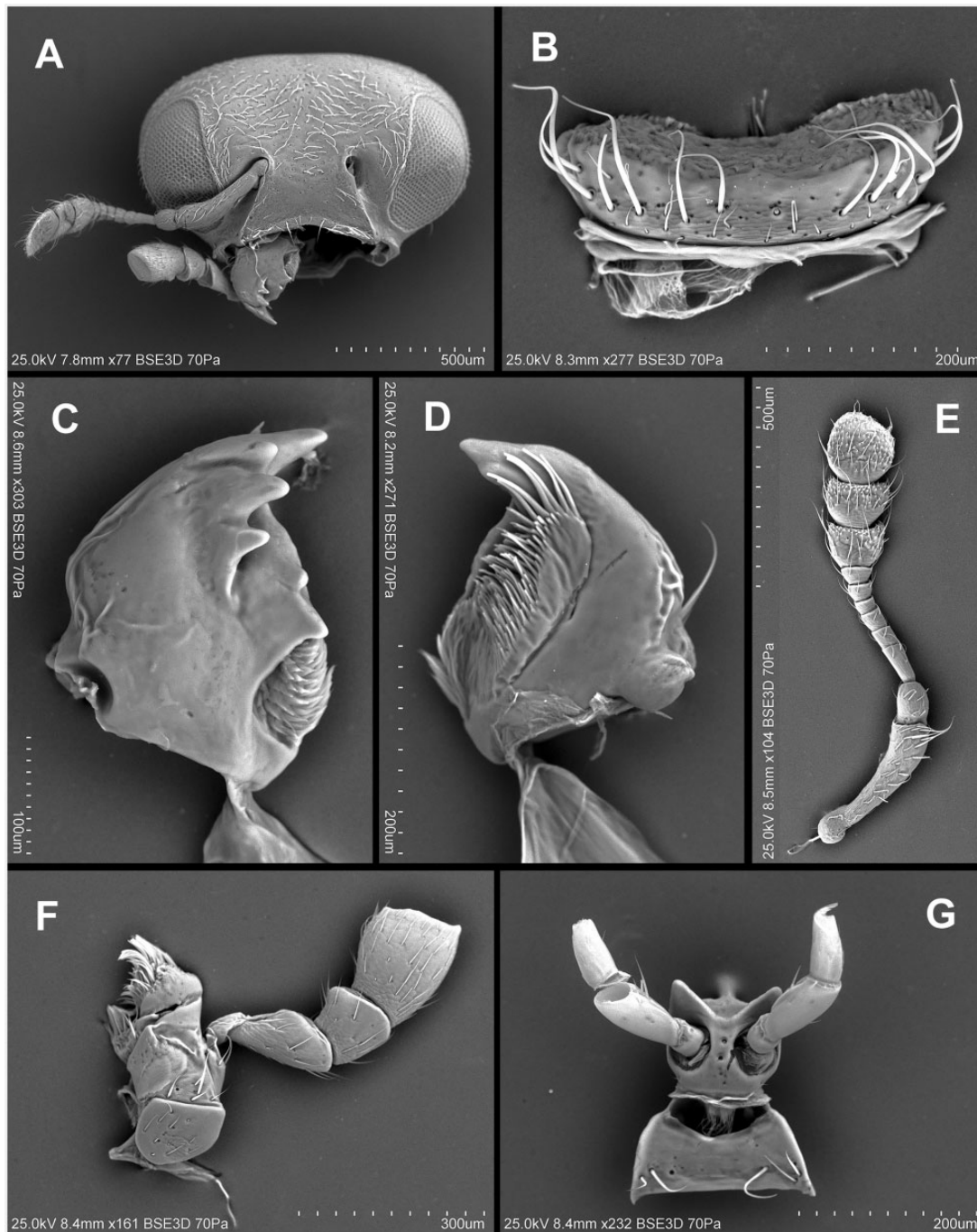


Fig. 28. *Megatela kamerunicola* (Mader). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

subtruncate (Fig. 30A); sternite VIII weakly emarginate (Fig. 30B); tergite VIII rounded (Fig. 30C); apodeme of male sternum IX absent (Fig. 30D). Tergite X transverse, rounded apically. In female: apical margin of ventrite 5 weakly truncate (Fig. 30E); ventrite 6 (Fig. 30F) rounded apically, with basal margin simply arcuate, longitudinally at middle not divided; tergite VIII rounded (Fig. 30G). Proctiger (TX) rounded.

Male genitalia (Fig. 30H–J). Tegminal basal piece without spines. Penis guide symmetrical, shorter than parameres, at apex entire; outer edge smooth; inner edge without additional process. Parameres well developed, broad, simple apically, with long hair in

apical part. Penis rod like, straight with basal T-shaped capsule reduced.

Female genitalia (Fig. 30K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites elongate, drop-like; outer edge of coxite free, inner edge simple, ventral surface smooth. Styli absent. Bursa copulatrix without sclerite, simple, nondivided, ending with common oviduct. Sperm duct and spermatheca absent.

Distribution. Cameroon.

Species included (examined): *M. kamerunicola* (Mader).

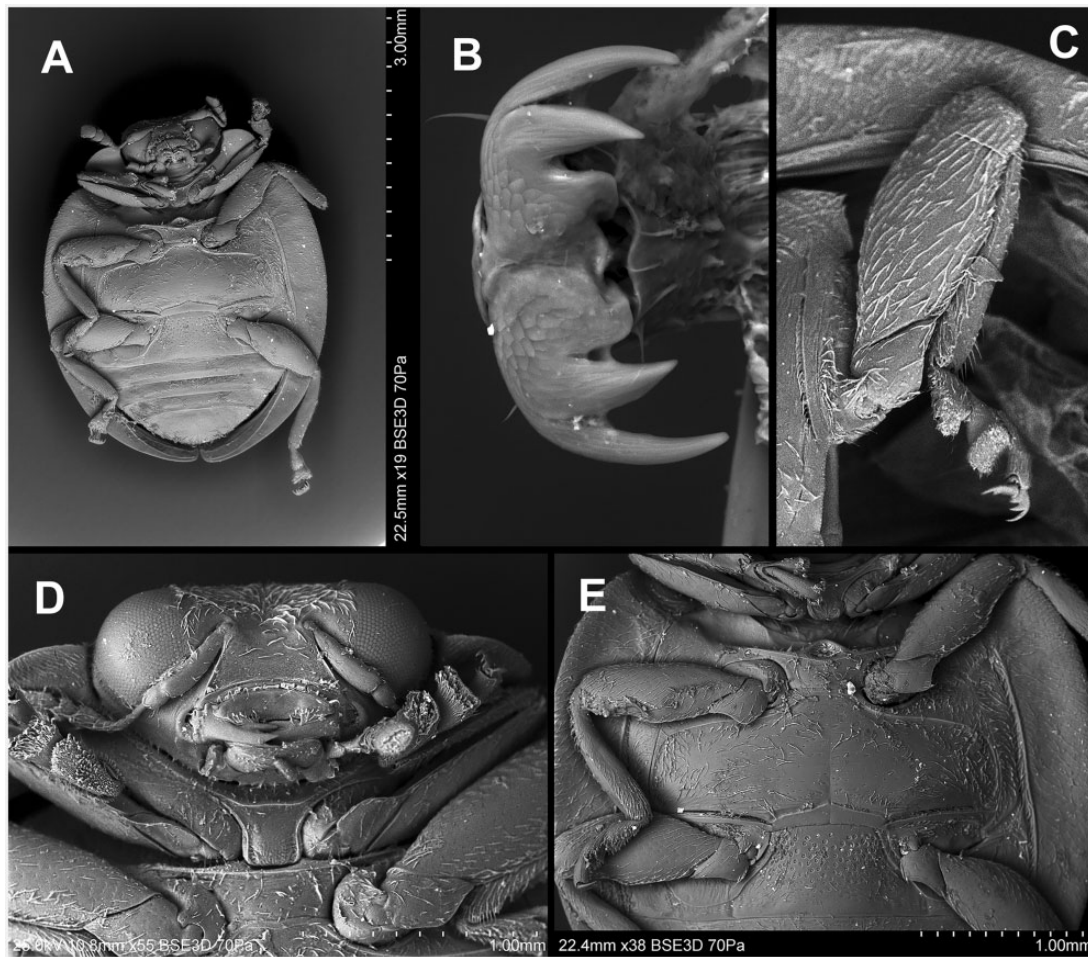


Fig. 29. *Megatela kamerunicola* (Mader). (A) Body, ventral view; (B) Tarsal claws; (C) Hind leg; (D) Head, pro, and mesothorax, ventral; (E) Meso- and metathorax, ventral, and abdominal ventrite 1.

Comment. Two species of *Megatela* are listed in the catalogue of Jadwiczak and Węgrzynowicz (2003). We were not able to study the type species of the genus and only the original description of Weise (1906) was consulted.

Figura Ukrainsky 2006
(Figs. 31–33 and 82G)

Bambusicola Fürsch 1986: 392 (nec *Bambusicola* Gould 1862; Aves). Type species: *Epilachna aberratica* Fürsch 1975 (by original designation).—Jadwiczak and Węgrzynowicz 2003: 192.

Figura Ukrainsky 2006: 399 (replacement name for *Bambusicola* Fürsch 1986).—Szawaryn 2014: 105, **redescription**); Szawaryn et al. 2015: 556, 565.

Diagnosis. *Figura* can be distinguished from other Epilachnini genera by the following combination of the characters: labium with scale-like processes on dorsal surface; the tarsal claws having characteristic shape with the inner teeth touching one another and forming a cordate pattern (character sharing only with the Neotropical genus *Malata* Gordon); lack of tibial spurs; male genitalia with the penis guide of tegmen short, petal-like and asymmetrical, and penis with large membranous gonopore at apex; female genitalia lacking sperm duct and spermatheca, and coxites fused laterally with paraprocts.

Description. Length 2.8–4.1 mm. Body (Fig. 32A and 82G) oval, convex, dorsum pubescent. Pronotum yellow to reddish brown or black, elytra light brown, orange to red with black spots or black border, sometimes entirely black with red maculae.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 31A) shorter than half length of gula. Antenna (Fig. 31E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel about as broad as scape; antennomeres 3–5 elongate, antennomeres 6–8 subquadrate or transverse; club symmetrical. Ventral and dorsal antennal grooves absent (Fig. 31A–B). Clypeus short, parallel-sided, its anterior margin straight or weakly emarginate, with weak groove. Labrum (Fig. 31B) strongly transverse, emarginate anteriorly. Mandible (Fig. 31C–D) multi-dentate apically; falcate; incisor edge without teeth, its surfaces smooth, prostheca well developed. Maxilla (Fig. 31F) with cardo semicircular; maxillary stipes much longer than galea with suture between basistipes and mediostipes partly well visible; lacinia simple, falcate, with mesal surface simply setose and longer setae on apex; galea about as long as wide, mostly sclerotized, its ventral surface glabrous, anterior margin covered with setae; terminal palpomere large, weakly elongate, parallel-sided or weakly expanded apically. Submentum about two times wider than long, suture not clearly visible; mentum (Fig. 31G) less than two times broader than long, widest in median part; prementum oval, its dorsal

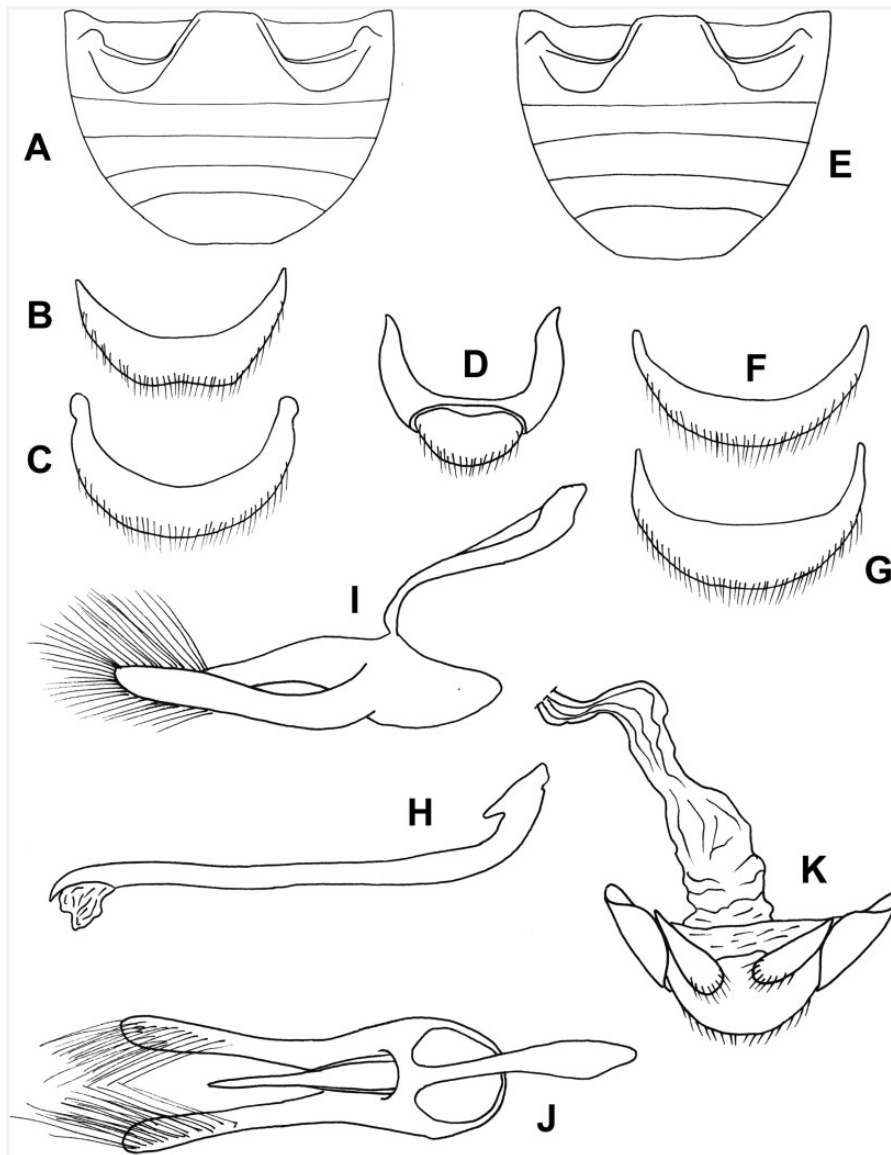


Fig. 30. *Megatela kamerunicola* (Mader). (A) Abdomen, male, ventral; (B) Abdominal sternite VIII, male, ventral; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment, ventral; (E) Abdomen, female, ventral; (F) Abdominal ventrite 6, female; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

surface with scale like projections, ligula without setae; labial palps (Fig. 31G) separated by distance distinctly less than width of palpiger; apical palpomere as long as and distinctly narrower than penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 32D) with surface smooth, without carinae. Prosternum in front of coxa shorter than half length of coxal longitudinal diameter, anterior margin uniformly arcuate. Procoxal cavity without visible bordering line.

Pterothorax. Mesoventrite (Fig. 32D–E) with anterior edge weakly emarginate, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight or sinuate. Inner edge of metanepisternum smooth. Scutellum triangular, as long as broad. Metendosternite tendons widely separated and placed near apices of arms. Elytra dually punctate; lateral margins narrow but entirely visible from above. Epipleuron (Fig. 32A) incomplete apically, smooth, its inner margin with bordering line extending at

most to level of mid coxa. Metaventral postcoxal lines (Fig. 32E) joined on metaventral process in straight or somewhat sinuate line, laterally complete and distinctly recurved.

Legs (Fig. 32A) rather short and slender with apices of mid and hind femora weakly protruding from outer margin of elytral epipleuron. Fore and mid trochanters simple with weak cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple; mid and hind tibiae on outer edge smooth, without carina. Tibiae without distinct spurs (Fig. 32C). Tarsal claws (Fig. 32B) double, swollen at base, with inner claws broad, almost touching each other, forming heart shape.

Abdomen (Fig. 33A and E). Six ventrites in males and five in females. Abdominal postcoxal lines recurved roundly but incomplete laterally. In male: apical margin of ventrite 5 truncate (Fig. 33A); ventrite 6 emarginate (Fig. 33B); tergite VIII rounded (Fig. 33C); apodeme of male sternum IX absent (Fig. 33D). Tergite

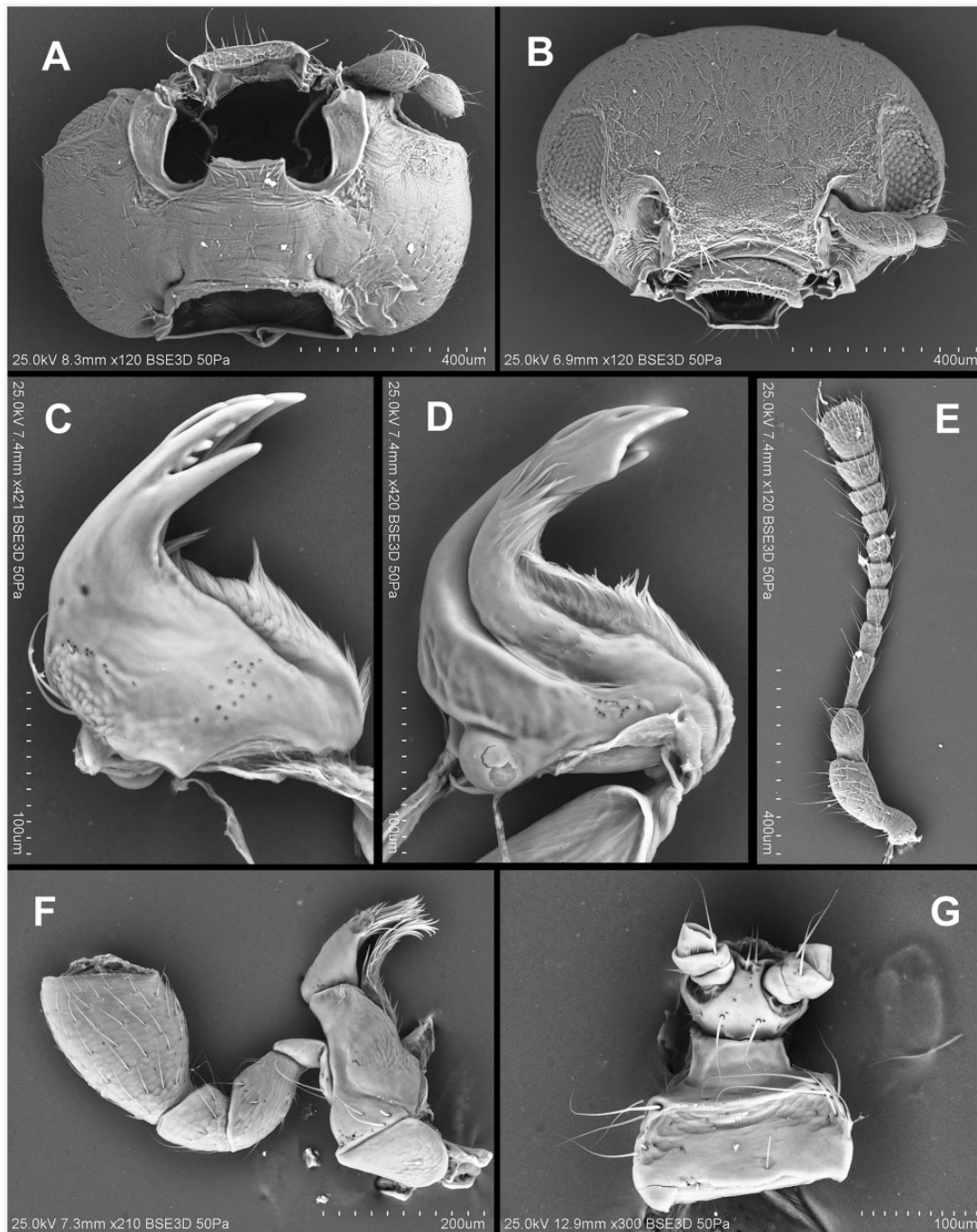


Fig. 31. *Figura ruwenzorica* Szawaryn. (A) Head, ventral view; (B) Head, antero-dorsal; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

X narrow, transverse, rounded apically. In female: apical margin of ventrite 5 rounded (Fig. 33E); sternite VIII (Fig. 33G) rounded at apex, with basal margin simply arcuate, longitudinally at middle not divided; tergite VIII rounded (Fig. 33F). Proctiger (TX) membranous at base, with simple posterior margin.

Male genitalia (Fig. 33H–J). Tegminal basal piece without spines. Penis guide petal-shaped, asymmetrical, about as long as parameres, pointed at apex; outer edge smooth; inner edge without additional processes. Parameres well developed, asymmetrical, simple apically. Penis widening towards apex with large membranous apical gonopore, its base with reduced T-shaped capsule.

Female genitalia (Fig. 33K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites much longer than wide, long-oval; outer edge of coxite fused with paraproct, inner edge simple, ventral surface smooth. Styli absent. Bursa copulatrix without sclerite, simple, nondivided, ending with common oviduct. Sperm duct, spermatheca and accessory gland absent; two symmetrical membranous sac-like structures at the base of common oviduct (which probably are a place for storing sperm instead of the spermatheca) present.

Distribution. Central Africa: Albertine Rift—Burundi, Democratic Republic of the Congo, Rwanda, Uganda.

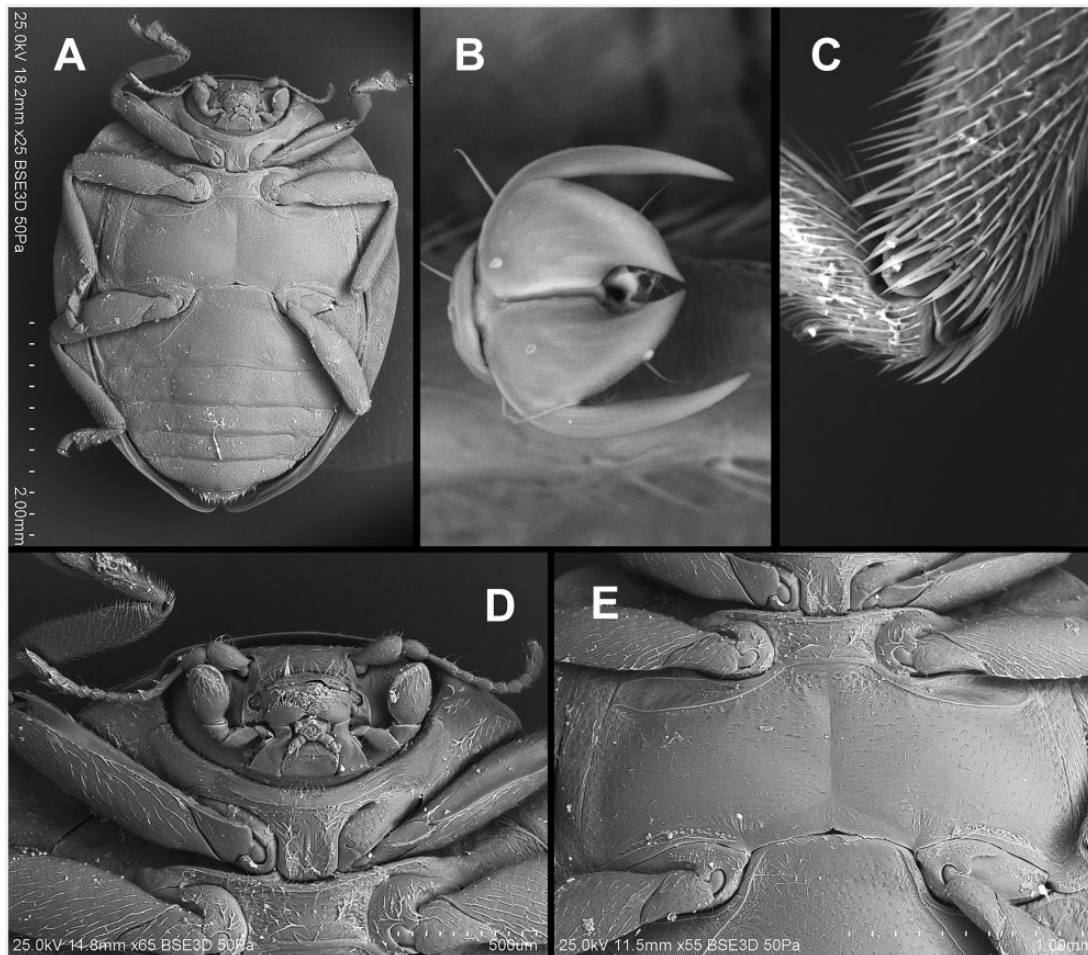


Fig. 32. *Figura ruwenzorica* Szawaryn. (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Head, pro, and mesothorax, ventral; (E) Meso- and metaventrite.

Species included (examined). *F. aberratica** (Fürsch), *F. bambusae* (Mader), *F. bitalensis* Szawaryn, *F. centralis* (Sicard), *F. lineata* Szawaryn, *F. ruwenzorica* Szawaryn, *F. tonsa* (Fürsch).

Comment. All known species were studied (according to the revision of the genus by Szawaryn 2014).

Tropha Weise 1900
(Figs. 34–36 and 82H)

Tropha Weise 1900b: 121. Type species: *Tropha variabilis* Weise 1900 (by monotypy).—Jadwiszczak and Węgrzynowicz 2003: 207, Tomaszewska and Szawaryn 2014: 348 (redescription), Szawaryn et al. 2015: 558, 566.

Diagnosis. *Tropha* is easily recognizable genus of Epilachnini by its long and deep ventral antennal grooves on the head, prosternum in front of coxae longer than coxal longitudinal diameter, deep epipleural foveae for receiving tips of mid and hind femora and the coxites of the ovipositor deeply emarginate on their inner edges near apices.

Description. Length 5.3–6.5 mm. Body (Fig. 35A and 82A) oval, strongly convex, dorsum pubescent. Elytra brown with black maculae, or elytra black with orange or yellow maculae.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 34A) shorter than half length of gula. Antenna

(Fig. 34E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomeres 3–5 weakly elongate; antennomeres 6–8 subquadrate or transverse; club asymmetrical. Ventral antennal grooves (Fig. 34A) long, deep, straight, reaching distinctly behind eyes. Dorsal antennal grooves absent. Clypeus short, parallel-sided, its anterior margin straight, smooth without groove. Labrum (Fig. 34B) moderately transverse, anterior margin emarginate with apex membranous. Mandible (Fig. 34C–D) multidentate apically; incisor edge multidentate, its surfaces smooth without tubercles, prosthema well developed. Maxilla (Fig. 34F) with cardo semicircular; maxillary stipes much longer than galea, with suture between basistipes and mediostipes well visible; lacinia simple, its mesal surface simply setose; galea as long as wide, oval, mostly sclerotized, its ventral surface at least sparsely pubescent; terminal palpomere weakly elongate, expanded apically. Submentum transverse, with suture visible, emarginate posteriorly; mentum (Fig. 34G) less than two times broader than long, widest near base; prementum oval, ligula shortly setose; labial palps (Fig. 34G) separated by distance distinctly less than width of palpiger; apical palpomere as long and about as broad as penultimate one.

Prothorax. Hypomeron (Fig. 35D) very coarsely punctured. Prosternal process (Fig. 35D) smooth, without carinae, with weak lateral grooves. Prosternum in front of coxa longer than coxal longitudinal diameter; anterior margin uniformly arcuate. Procoxal cavity without visible bordering line.

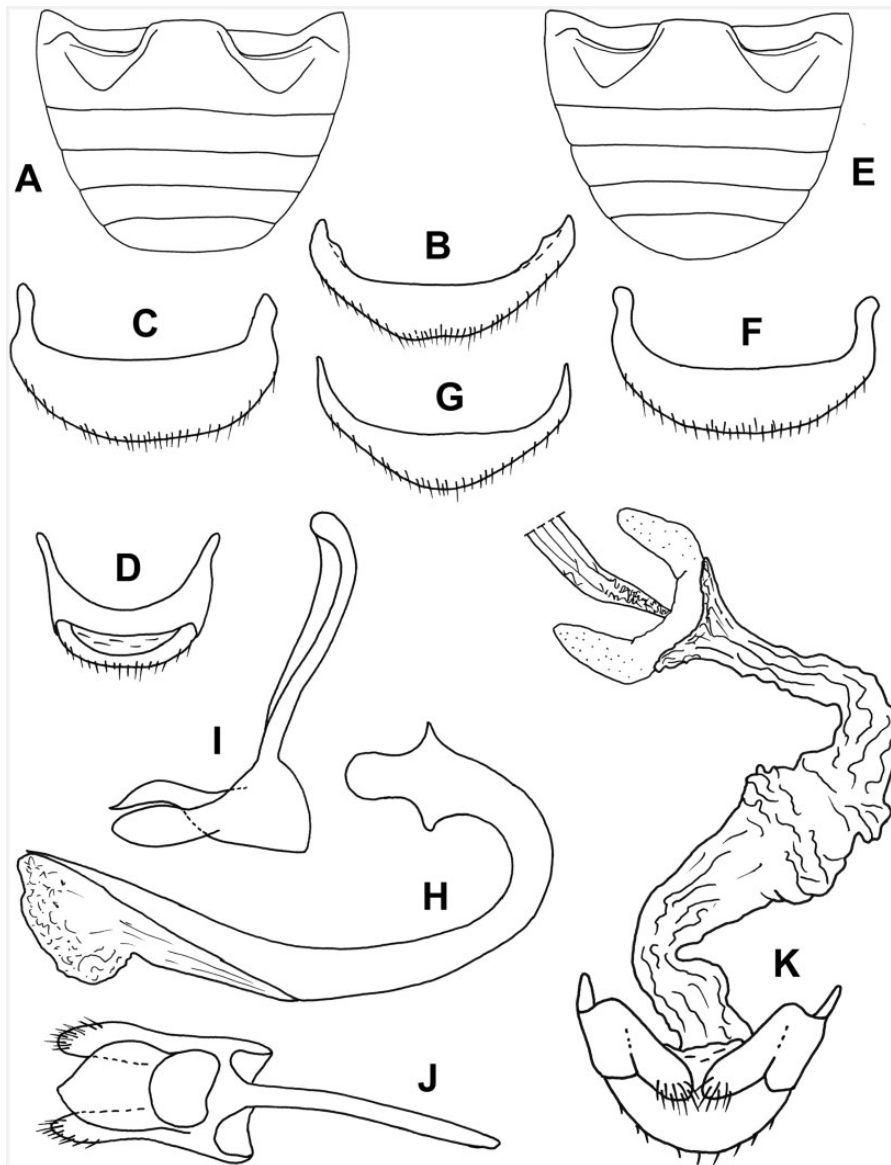


Fig. 33. *Figura ruwenzorica* Szawaryn. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal tergite VIII, female, ventral; (G) Abdominal sternite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Pterothorax. Mesoventrite (Fig. 35E) with anterior edge emarginate, anterior margin entirely raised; mesoventral process coarsely punctured; meso-metaventral suture emarginate posteriorly. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins narrow but entirely visible from above. Epipleuron (Fig. 35A) incomplete apically with foveae for receiving tips of femora, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines (Fig. 35E) joined on metaventral process in weakly arcuate line, laterally complete and distinctly recurved.

Legs (Fig. 35A) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters angulately produced with cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora swollen, simple along inner edge; mid

and hind tibiae on outer edge with oblique carina near apex (Fig. 35C). Tibial spurs: 1-2-2. Tarsal claws (Fig. 35B) double, weakly swollen at base.

Abdomen. Six ventrites in both sexes. Abdominal postcoxal lines (Fig. 36A and H) recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 36A); ventrite 6 rounded (Fig. 36B); tergite VIII rounded (Fig. 36C); apodeme of sternum IX rod-like, stout (Fig. 36D). Tergite X transverse, rounded at apex. In female: ventrite 5 rounded (Fig. 36H); ventrite 6 (Fig. 36I) rounded, produced anteriorly at base, longitudinally at middle not divided; tergite VIII rounded at apex (Fig. 36J). Proctiger (TX) transverse, rounded or emarginate apically.

Male genitalia (Fig. 36E–G). Tegminal basal piece without spines. Penis guide symmetrical, about as long as parameres, broad at its base, pointed at apex; outer edge setose; inner edge without additional process. Parameres well developed, broadened apically.

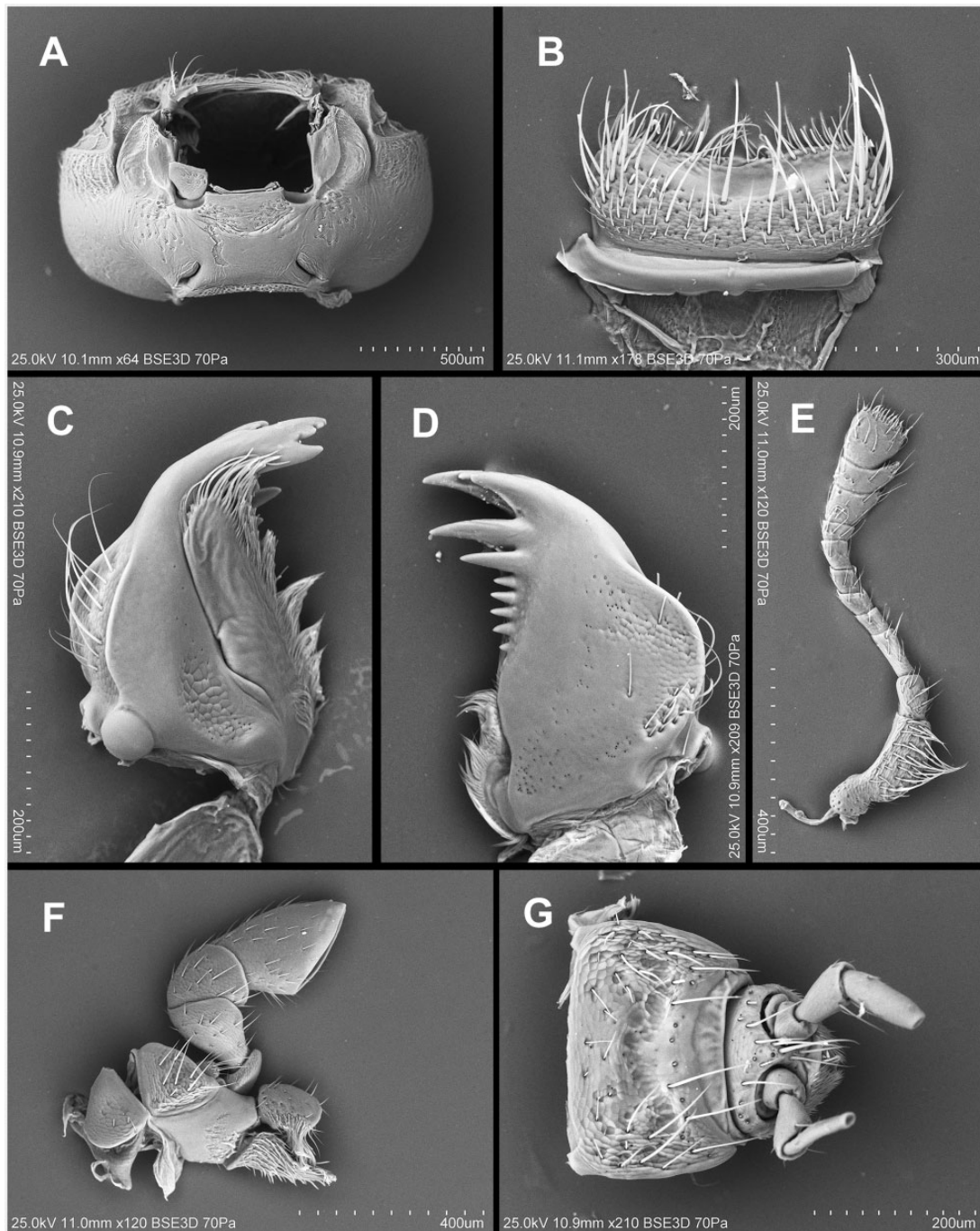


Fig. 34. *Tropha variabilis* Weise. (A) Head, ventral view; (B) Labrum; (C) Mandible, ventral view; (D) Mandible, dorsal view; (E) Antenna; (F) Maxilla; (G) Labium.

Penis stout, narrowing apically, with large gonopore at apex, its base with reduced T-shaped capsule.

Female genitalia (Fig. 36K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, oval; outer edge of coxite free, inner edge deeply, angulately emarginate near apex, ventral surface smooth. Styli distinct. Bursa copulatrix without sclerite, divided in two parts, one large weakly sclerotized dorsal pocket blind and second, ventral part ending with common oviduct. Sperm duct and spermatheca absent.

Distribution. Africa: Cameroon, Democratic Republic of the Congo, Malawi, Mozambique, Tanzania, Zambia.

Species included (examined). *Tropha variabilis** Weise, *T. vigintiduoguttata* (Weise), *T. zambiensis* Tomaszewska and Szawaryn.

Comment. All known species were studied (according to the revision of the genus by Tomaszewska and Szawaryn 2014).

Uniparodentata Wang and Cao 1993 stat. nov.
(Figs. 37–39 and 83I)

Epilachna (Uniparodentata) Wang and Cao 1993: 126. Type species, *Epilachna paramagna* Pang and Mao 1979 (by original designation).

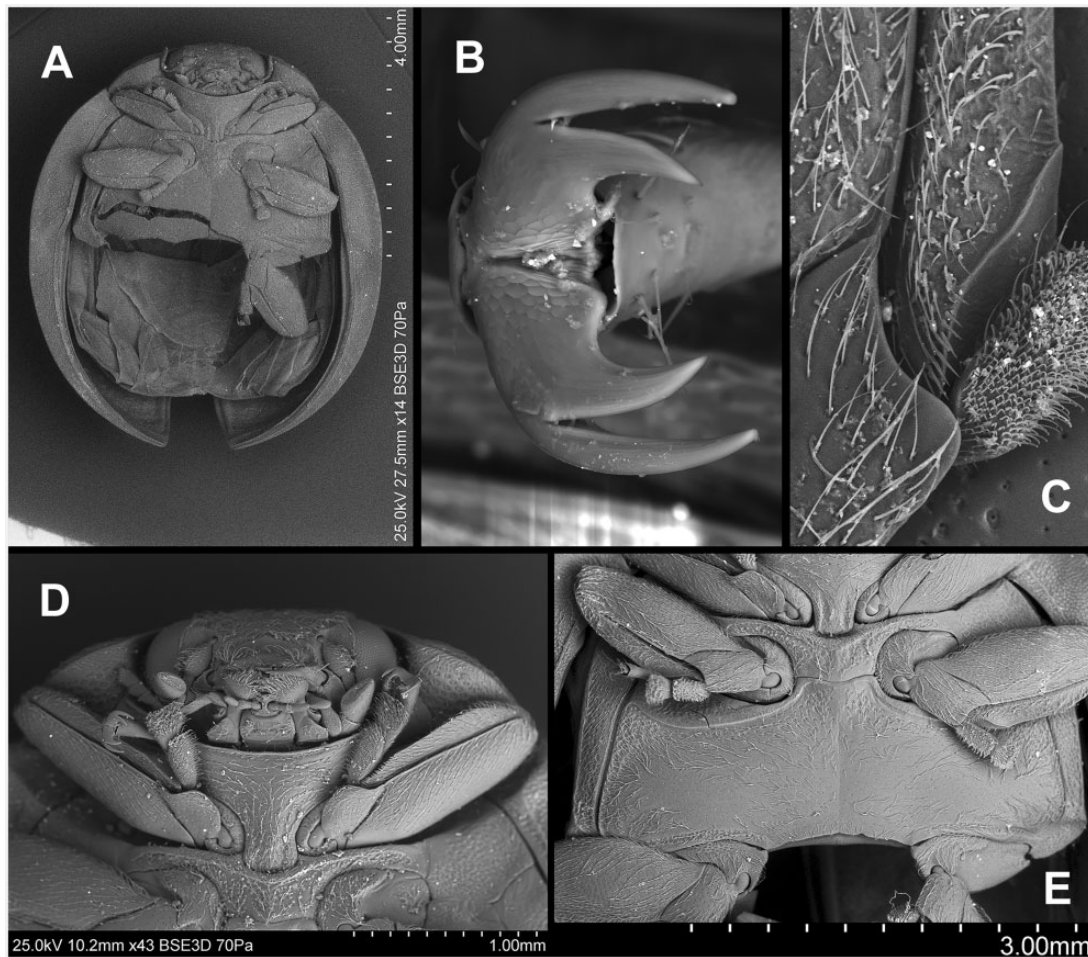


Fig. 35. *Tropha variabilis* Weise. (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Head, pro, and mesothorax, ventral; (E) Meso- and metaventrite.

Epilachna (*Aparodontata*) Wang and Cao 1993: 126. Type species, *Epilachna yongshanensis* Cao and Xiao 1984 (by original designation). **Syn. nov.**

Ryszardia Tomaszewska and Szawaryn, in Szawaryn et al. 2015: 563. Type species: *Epilachna decipiens* Crotch 1874 (by original designation). **Syn. nov.**

Epilachna Chevrolat in Dejean 1837 (in part).—Szawaryn et al. 2015: 552, 563, 566.

Diagnosis. *Uniparodontata* resembles *Diekeana* by presence of serration on inner margin of metanepisternum and the prosternal process most often with lateral carinae. *Uniparodontata* however, can be separated from *Diekeana* by mid and hind coxae provided with small tubercles on hind/inner surfaces (which is a unique character among all genera of Epilachnini), metaventral postcoxal lines most often separate on metaventral process, elytral epipleuron often with foveae and mid and hind tibia with oblique carina near apex.

Description. Length 5.5–10.3 mm. Body (Fig. 83I) oval to elongate oval, convex, dorsum pubescent. Elytra orange, red or brown with black maculae or stripes; sometimes elytra black with orange or red maculae or stripes.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 37A) shorter than half length of gula. Antenna (Fig. 37E) composed of 11 antennomeres, length 0.5–1.0 head

width; pedicel distinctly narrower than scape; antennomeres 3–8 weakly or distinctly elongate; club asymmetrical. Ventral antennal grooves absent or sometimes short, straight, along inner margin of eye only (Fig. 37A). Dorsal antennal grooves absent. Clypeus short, parallel-sided, its anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 37B) transverse, straight or weakly emarginate anteriorly. Mandible (Fig. 37C–D) multidentate apically; incisor edge weakly roundly produced, without teeth, its surfaces smooth or provided with weak tubercles, prostheca well developed. Maxilla (Fig. 37F) with cardo semicircular; maxillary stipes much longer than galea, in form of single sclerite with at most weak trace of suture visible; lacinia simple, its mesal surface simply setose; galea oval, about as long as wide, mostly sclerotized its ventral surface sparsely pubescent; terminal palpomere elongate, broadened apically. Submentum transverse, gular suture not clearly visible; mentum (Fig. 37G) less or more than two times broader than long, widest near base or in mid length; prementum suboval, ligula shortly setose or sometimes without setae; labial palps (Fig. 37G) separated by distance distinctly less than width of palpiger or equal to width of palpiger; apical palpomere about as long and as broad as penultimate one.

Prothorax. Hypomeron very coarsely punctured (Fig. 38A). Prosternal process (Fig. 38A) with distinct lateral carinae. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter or shorter than half length of coxal diameter, its anterior

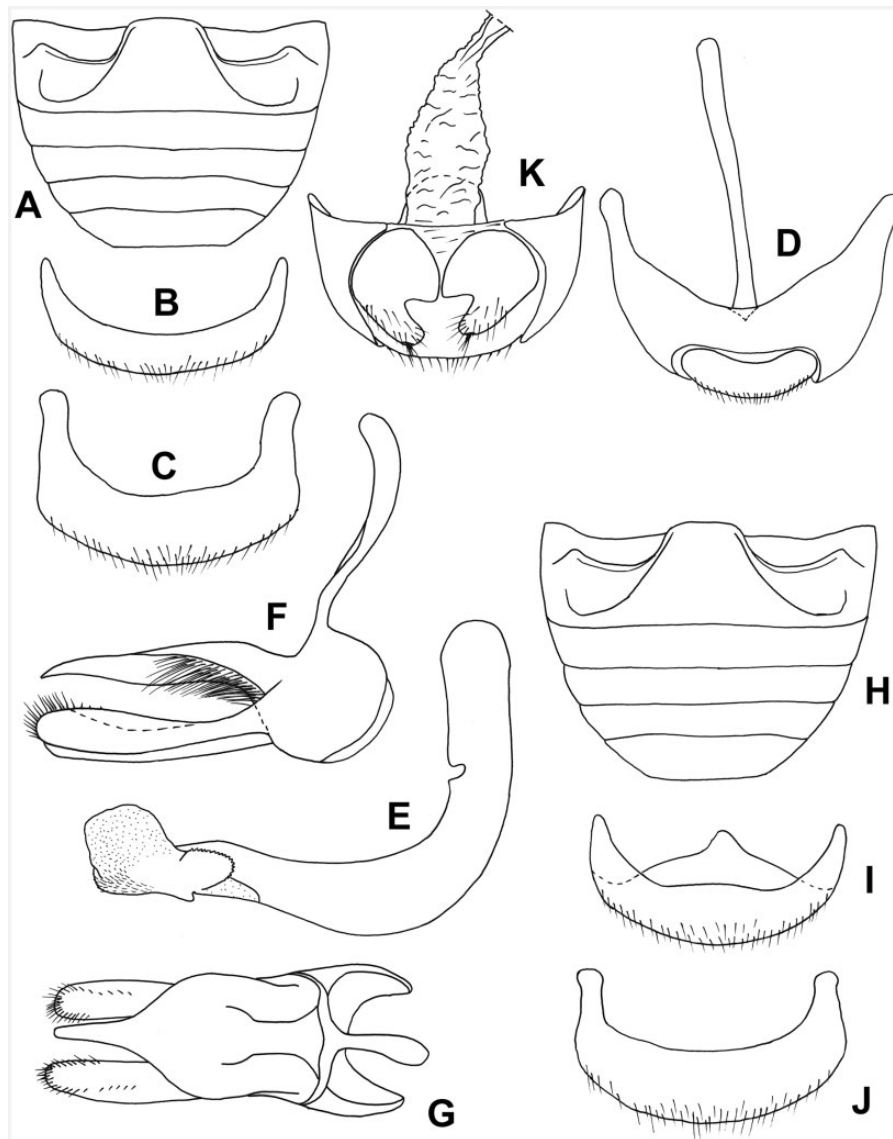


Fig. 36. *Tropha variabilis* Weise. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Penis; (F) Tergmen, ventral view as placed in abdomen; (G) Tergmen, its inner view; (H) Abdomen, female, ventral; (I) Abdominal ventrite 6, female; (J) Abdominal tergite VIII, female, ventral; (K) Female genitalia.

margin uniformly arcuate. Procoxal cavity without visible bordering line.

Pterothorax. Mesoventrite (Fig. 38A–B) with anterior edge emarginate posteriorly, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight or weakly sinuate. Inner edge of metanepisternum serrate (Fig. 38D–E). Scutellum pentagonal or triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins entirely visible from above, although sometimes narrow. Epipleuron incomplete apically, smooth or with foveae for receiving tips of femora, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines (Fig. 38B) widely separated on metaventral process or sometimes joined on metaventral process in straight line, laterally complete and distinctly recurved.

Legs moderately long and slender with apices of mid- and hind femora protruding from outer margin of elytral epipleuron, or short and stout, with apices of mid- and hind femora not protruding from

outer margin of epipleuron. Fore and mid trochanters roundly or angulately produced or simple, with distinct or weak cavities on their inner surfaces for receiving tips of tibiae in repose. Mid and hind coxae with tubercles on hind margin (Fig. 38C); mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 38G). Tibial spurs: 1-2-2. Tarsal claws (Fig. 38F) double, smooth or swollen at base.

Abdomen. Five or six ventrites in both sexes. Abdominal postcoxal lines (Fig. 39A and 39E) recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 (Fig. 39A) subtruncate or deeply concave; sternite VIII (or ventrite 6) (Fig. 39B) emarginate apically or deeply concave; tergite VIII (Fig. 39C) rounded or slightly truncate apically; apodeme of male sternum IX (Fig. 39D) well developed, rod-like, stout or sometimes extremely narrow. Tergite X (Fig. 39D) in form of small, transversely-oval plate, sometimes simple—large, transverse. In female: apical margin of ventrite 5 (Fig. 39E) rounded or deeply concave; sternite VIII (or ventrite 6) (Fig. 39F) rounded or deeply

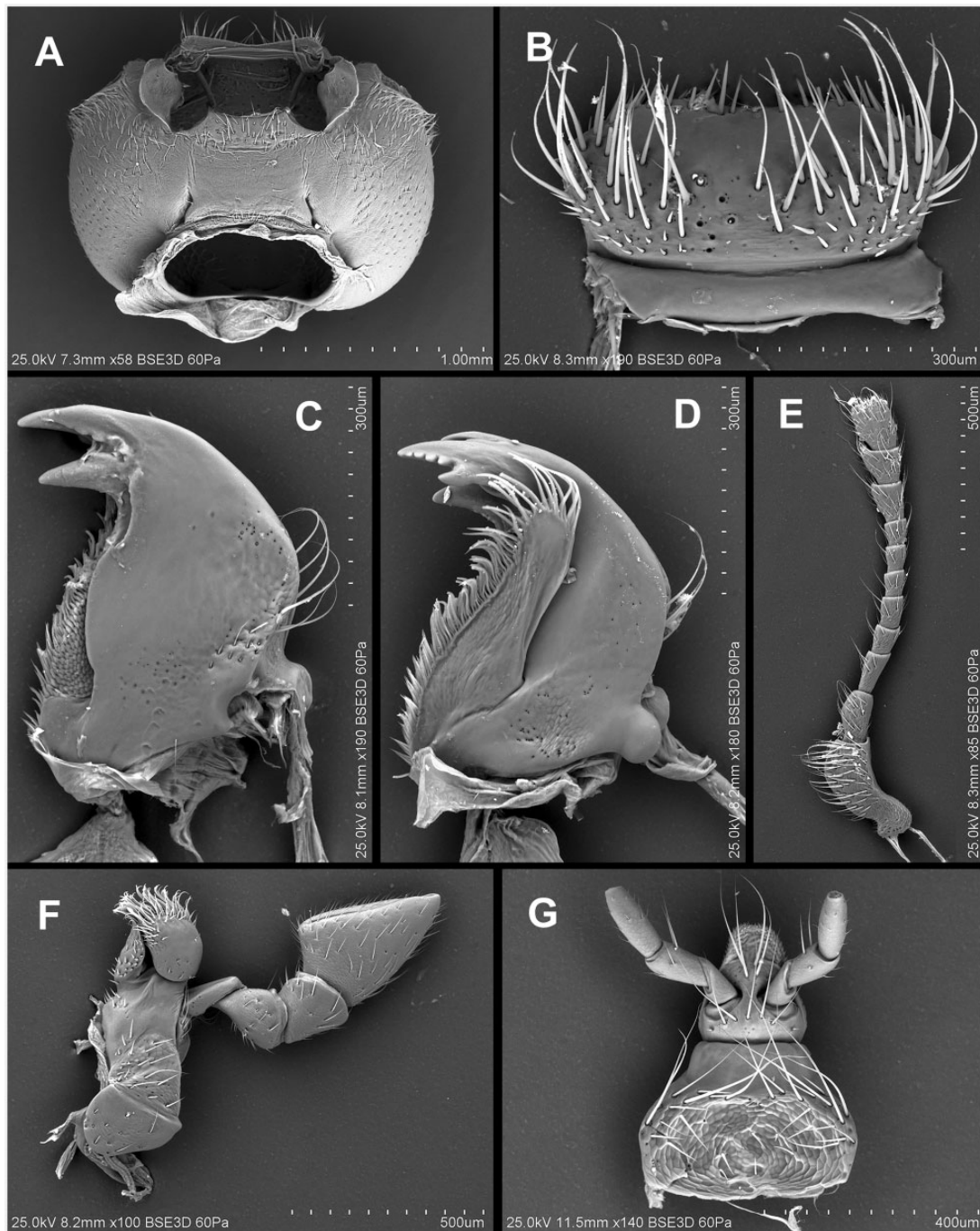


Fig. 37. *Uniparodentata chapini* (Dieke). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

emarginate, longitudinally at middle not divided; tergite VIII rounded (Fig. 39G). Proctiger (TX) rounded apically or rolled up inwardly (Fig. 39L).

Male genitalia (Fig. 39H–J). Tegminal basal piece without spines. Penis guide symmetrical, at apex entire or emarginate; outer edge smooth or at most setose; inner edge without additional process. Parameres well developed, simple or very large, broadened throughout. Penis rod-like, straight or sinuate, often with processes or tubercles at apex, its base with reduced T-shaped capsule.

Female genitalia (Fig. 39K and L). Sclerite anteriorly to coxites in membrane connected paraprocts absent. Coxites elongate-oval much

longer than wide or distinctly less than two times longer than wide, broad, transversely-oval or club-like; outer edge of coxite free, inner edge simple—straight, ventral surface. Styli distinct. Bursa copulatrix without sclerite, simple, nondivided, with common oviduct originated at base. Sperm duct originated apically on bursa copulatrix.

Distribution. South and South-Eastern Asia: China, India, Indonesia, Thailand, Vietnam.

Species included (examined). *Uniparodentata acuta* (Weise) **comb. nov.**, *U. angusta* (Li) **comb. nov.**, *U. bifibra* (Li) **comb. nov.**, *U. boymi* (Jadwiszczak and Węgrzynowicz) **comb. nov.**, *U. chapini*

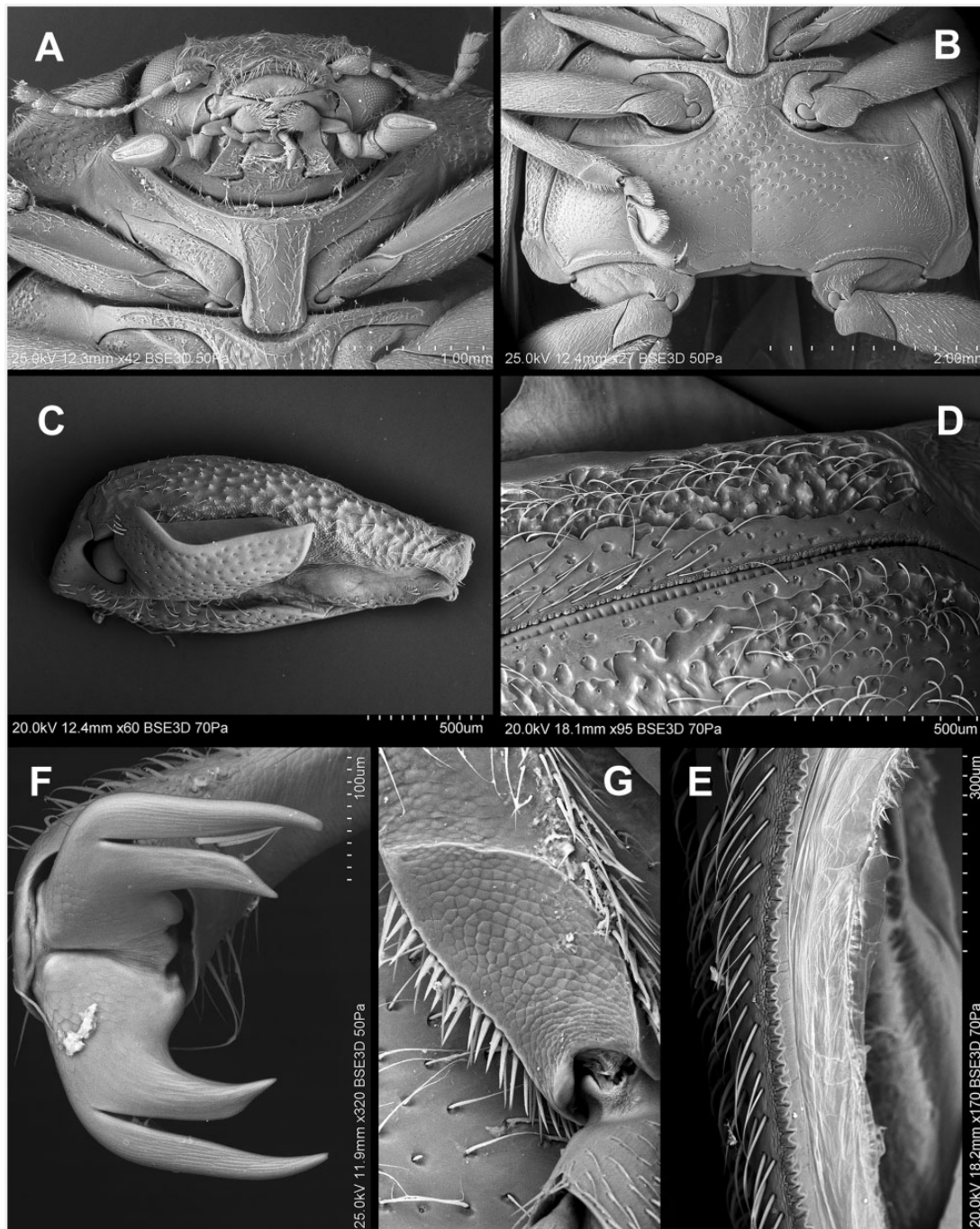


Fig. 38. *Uniparodentata chapini* (Dieke). (A) Head and prothorax, ventral; (B) Meso- and metathorax, ventral; (C) Hind coxa; (D) junction between metaventre and metanepisternum; (E) Inner edge of metanepisternum; (F) Tarsal claws; (G) Hind tibia, apex.

(Dieke) comb. nov., *U. chingjing* (Yu and Wang) comb. nov., *U. circumdata* (Hoàng) comb. nov., *U. circummaculata* (Pang and Mao) comb. nov., *U. clematicola* (Cao and Xiao) comb. nov., *U. complicata* (Dieke) comb. nov., *U. convexa* (Dieke) comb. nov., *U. crepida* (Pang and Ślipiński) comb. nov., *U. decipiens* (Crotch) comb. nov., *U. dorotae* (Bielawski) comb. nov., *U. exornata* (Bielawski) comb. nov., *U. folifera* (Pang and Mao) comb. nov., *U. fugongensis* (Cao and Xiao) comb. nov., *U. glochisifoliata* (Pang and Mao) comb. nov., *U. gressiti* (Li) comb. nov., *U. hamulifera* (Pang and Ślipiński) comb. nov., *U. lata* (Li) comb. nov., *U. madanensis* (Zeng) comb. nov., *R. magna* (Dieke) comb. nov., *U. malleforma* (Peng, Pang and

Ren) comb. nov., *U. media* (Li) comb. nov., *U. militaris* (Dieke) comb. nov., *U. mobiliteratae* (Li) comb. nov., *U. paramagna** Pang and Mao, *U. quadricollis* (Dieke) comb. nov., *U. saginata* (Weise) comb. nov., *U. siphodenticulata* (Hoàng) comb. nov., *U. subacuta* (Dieke) comb. nov., *U. szechuana* (Dieke) comb. nov., *U. yongshanensis* (Cao and Xiao) comb. nov.

Comment. The revision of Asian fauna of former *Epilachna* species would probably reveal more species belonging to *Uniparodentata*.

Apart from the named/determined species, an unnamed species of former Asian *Epilachna* was examined (voucher specimen used in Szawaryn et al. 2015: E.sp_KS169).

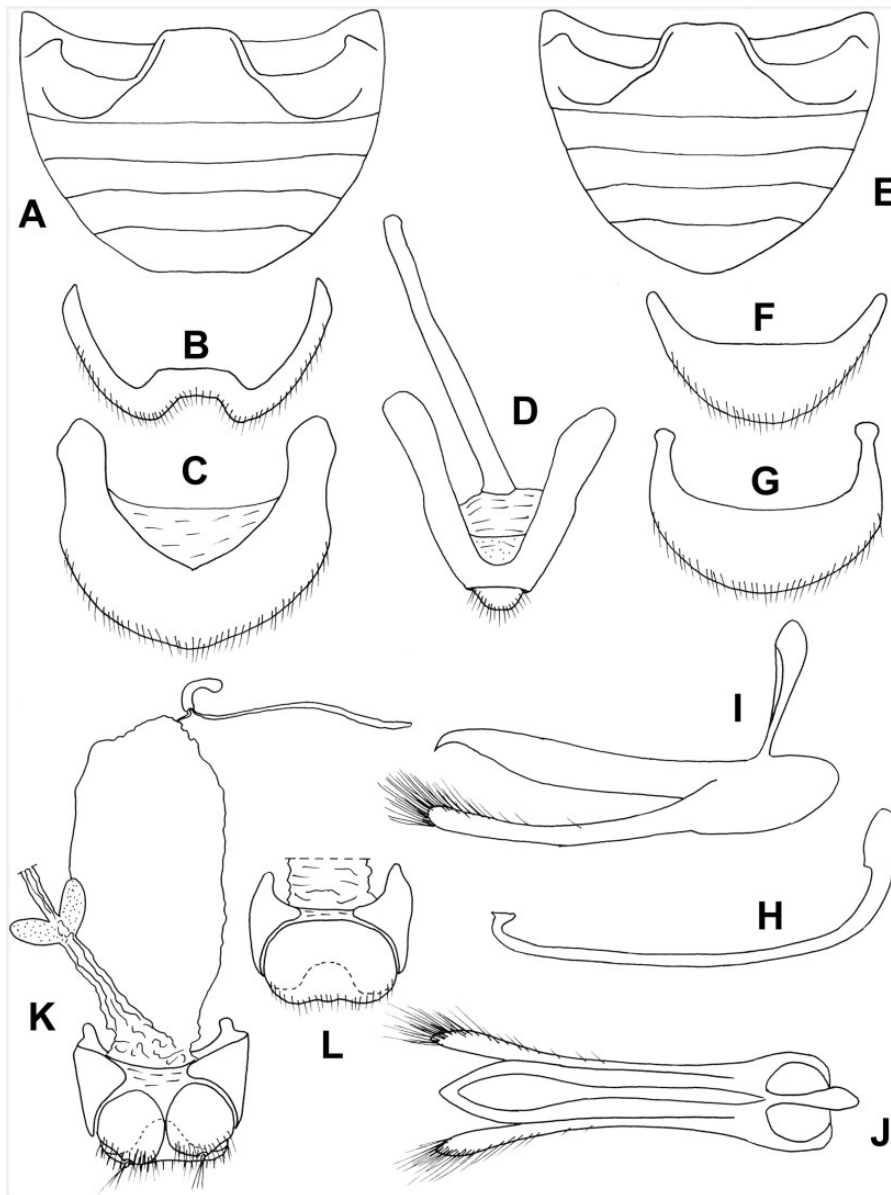


Fig. 39. *Uniparodentata decipiens* (Crotch). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment, ventral; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia; (L) Proctiger (TX), dorsal.

Solanophila Weise 1898 Name Resurrected
(Figs. 40–42 and 83D)

Solanophila Weise 1898: 99. Type species, *Epilachna gibbosa* Crotch 1874 (by subsequent designation of Li and Cook 1961). Synonymized with *Epilachna* Chevrolat in Dejean 1837 by Korschefsky 1931: 18.—Li and Cook 1961, Jadwiszczak and Węgrzynowicz 2003: 31.

Fuerschia Tomaszewska and Szawaryn in Szawaryn et al. 2015: 563. Type species: *Coccinella canina* Fabricius 1781 (by original designation). **Syn. nov.**

Epilachna Chevrolat in Dejean 1837 (in part).—Szawaryn et al. 2015: 554, 563, 566.

Diagnosis. *Solanophila* is very similar to *Trophpa* in having the tarsal claws double without basal angulation or tooth, mid and hind

tibia with oblique carina on outer edge near apex, the hypomeron coarsely punctured, and similar male genitalia with stout penis possessing strongly reduced basal capsule. However, short and rather shallow ventral antennal grooves, the elytral epipleura without foveae, the coxites of the ovipositor simple, not emarginate on their inner margins near apices and the presence of the spermatheca will easily separate *Solanophila* from *Trophpa*.

Description. Length 5.5–8.0 mm. Body (Fig. 41A and 83D) oval or elongate oval, strongly convex, dorsum pubescent. Elytra variably colored, usually black with yellow-orange maculae, sometimes orange-brown with black maculae, sometimes elytra red with black suture and margins, and with yellow maculae, often a crescent-shaped macula present in apical part of elytra.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 40A) shorter than half length of gula. Antenna (Fig. 40E)

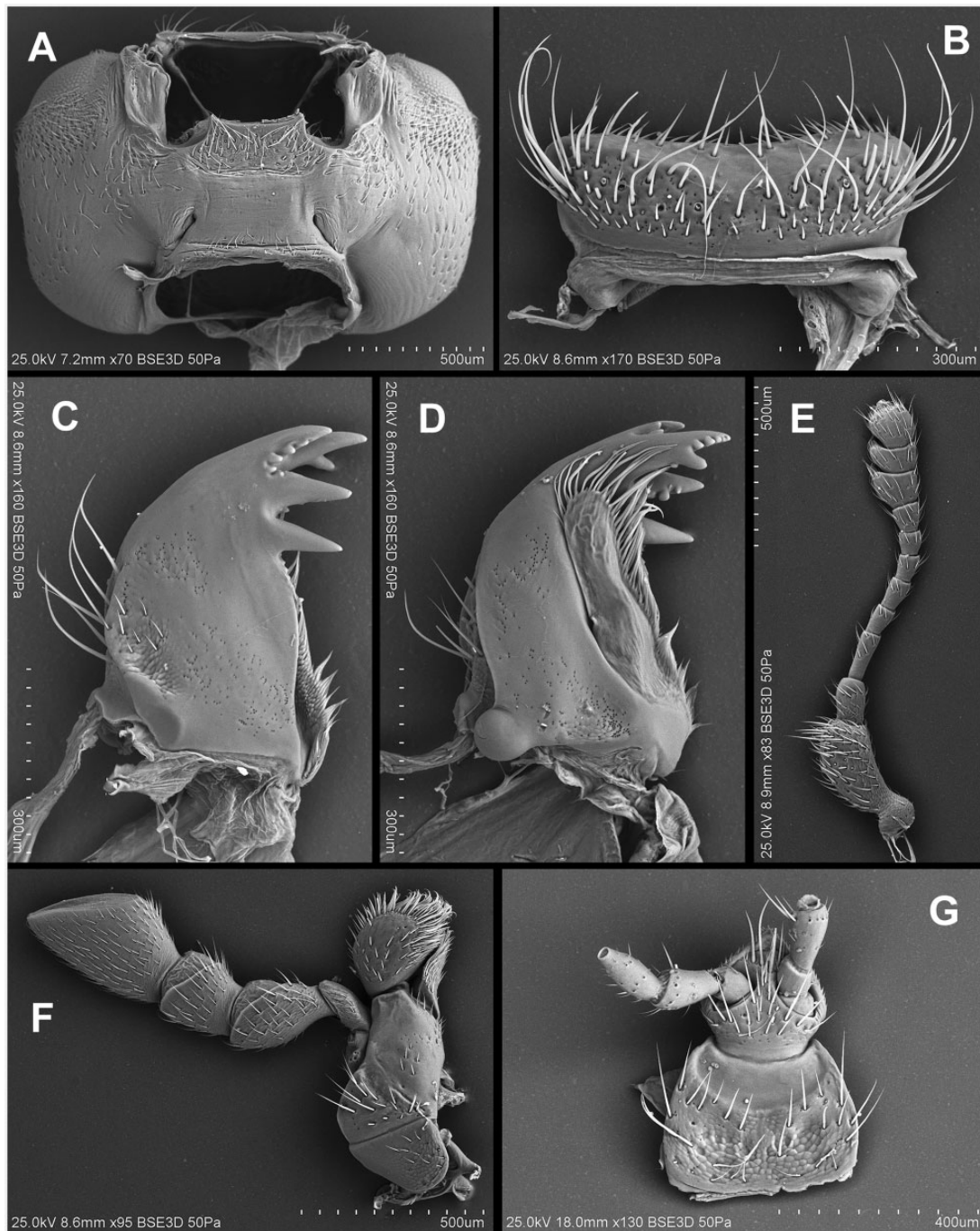


Fig. 40. *Solanophila dregei* (Mulsant). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 elongate, about 3 times longer than long; antennomeres 4–8 weakly elongate; club asymmetrical. Ventral antennal grooves (Fig. 40A) short, straight, along inner margin of eye only or absent. Dorsal antennal grooves absent. Clypeus short, parallel-sided, its anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 40B) transverse, anterior margin emarginate. Mandible (Fig. 40C–D) multidentate apically; incisor edge without teeth or sometimes with small denticles, its surfaces smooth without tubercles, prosthema well developed. Maxilla (Fig. 40F) with cardo semicircular; maxillary stipes

much longer than galea, with suture between basistipes and medio-stipes partly visible; lacinia simple, its mesal surface simply setose; galea oval, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere elongate, broadened apically. Submentum transverse about twice as broad as long with suture not clearly visible; mentum (Fig. 40G) less than two times broader than long, widest near base; prementum oval, ligula shortly setose; labial palps (Fig. 40G) separated by distance distinctly less than width of palpiger; apical palpomere as long and about as broad as penultimate one.

Prothorax. Hypomeron very coarsely punctured (Fig. 41D). Prosternal process (Fig. 41D) often with separate, short, weak

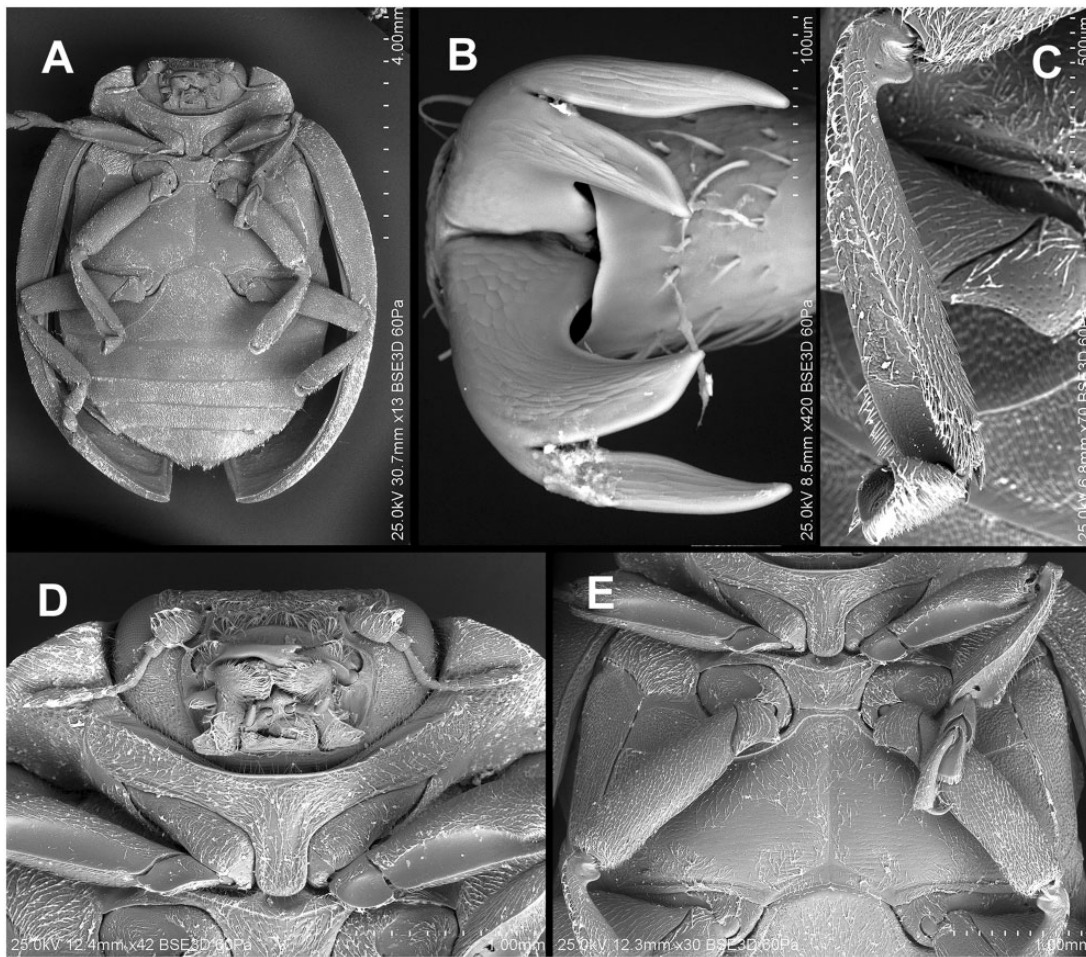


Fig. 41. *Solanophila dregei* (Mulsant). (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Head and prothorax, ventral; (E) Pro-, meso-, and meta-thorax, ventral.

carinae. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter; anterior margin uniformly arcuate, raised with distinct border. Procoxal cavity without visible bordering line or with bordering line reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 41E) with anterior edge emarginate, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins at least narrow, entirely visible from above. Epipleuron (Fig. 41A) incomplete apically, smooth, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral post-coxal lines (Fig. 41E) joined on metaventral process in straight line, laterally complete and distinctly recurved.

Legs (Fig. 41A) slender with apices of mid and hind femora protruding or not from outer margin of elytral epipleuron. Fore and mid trochanters roundly produced. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 41C), sometimes carina absent. Tibial spurs: 1-2-2, rarely spurs absent. Tarsal claws (Fig. 41B) double, swollen at base.

Abdomen. Six ventrites in males and five or six ventrites in females. Abdominal postcoxal lines (Fig. 42A and E) recurved

roundly or parallel to hind margin of ventrite 1 and at most scarcely recurved, incomplete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 42A); ventrite 6 truncate to emarginate (Fig. 42B); tergite VIII rounded or weakly narrowly emarginate at apex (Fig. 42C); apodeme of male sternum IX simple, rod-like (Fig. 42D). Tergite X transverse, narrow, subtruncate apically. In female: apical margin of ventrite 6 (Fig. 42F) rounded or emarginate, without projection at basal margin, longitudinally at middle not divided; tergite VIII rounded (Fig. 42G). Proctiger (TX) subtriangular or transverse, emarginate or arcuate, or rounded apically.

Male genitalia (Fig. 42H–J). Tegminal basal piece without spines. Penis guide symmetrical, about as long as parameres, at apex entire, curved; outer edge smooth, at most setose; inner edge without additional process. Parameres well developed, simple apically, setose at apex. Penis straight or S-shaped with large, elongate, membranous or sclerotized gonopore at apex, its base with reduced T-shaped capsule.

Female genitalia (Fig. 42K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites transverse subtriangular or elongate subrectangular; outer edge of coxite free, inner edge simple—straight or rounded, ventral surface smooth. Styli distinct. Bursa copulatrix sometimes with internal sclerite, simple, nondivided with common oviduct originated at base. Sperm duct originated apically on bursa copulatrix.

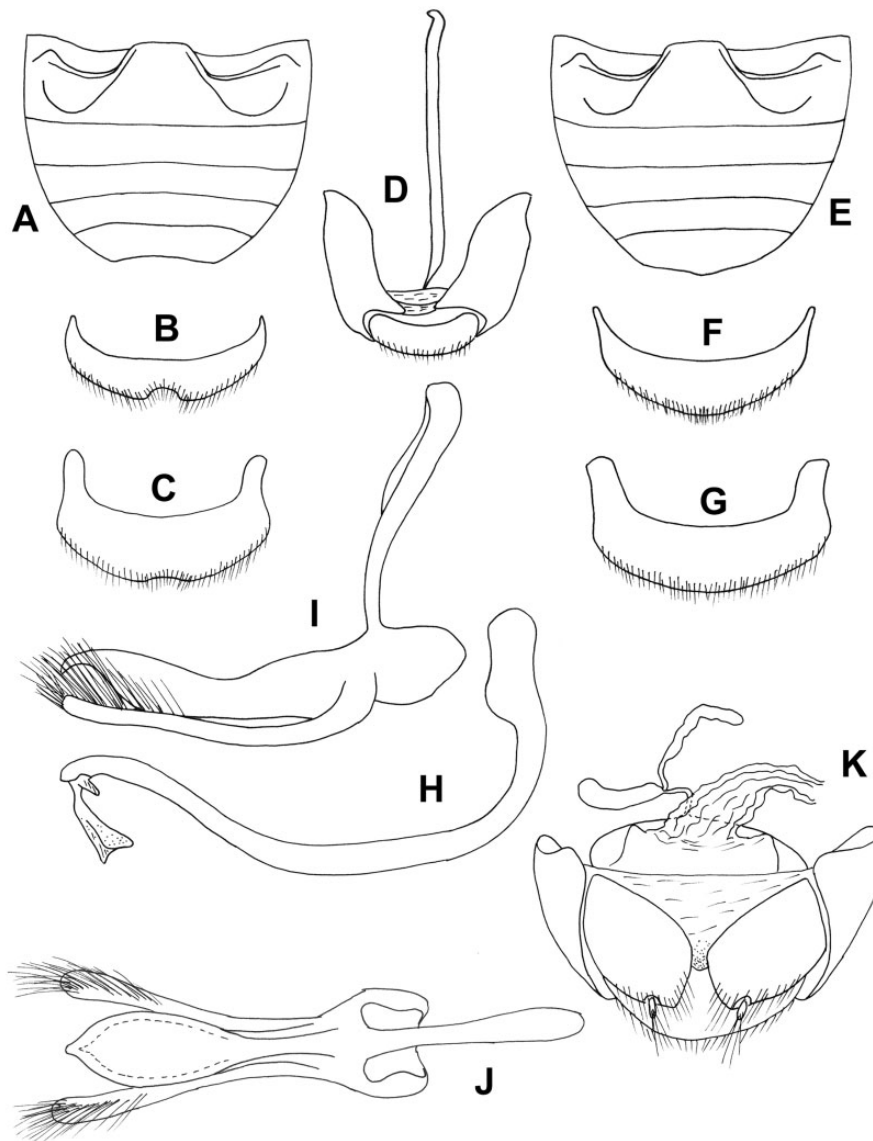


Fig. 42. *Solanophila canina* (Fabricius). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Distribution. Africa.

Species included (examined). *Solanophila canina* (Fabricius) **comb. nov.**, *S. dregei* (Mulsant) **comb. nov.**, *S. gibbosa** (Crotch), *S. karisimbica* Weise, *S. murrayi* (Crotch) **comb. nov.**, *S. infirma* (Mulsant) **comb. nov.**, *S. paykullii* (Mulsant) **comb. nov.**, *S. deltoides* (Weise).

Comment. According to Szawaryn et al. (2015), species included in this genus were classified in *Epilachna canina* group (Mader 1941, Fürsch 1985) and *E. colorata* group (Fürsch 1991), containing in total, 46 species. Among them, *S. gibbosa* and *S. deltoides* were originally included in the genus *Solanophila* by Weise. For proper assignment of remaining species, taxonomic revision is needed.

Epiverta Dieke 1947
(Figs. 43–45 and 83E)

Epiverta Dieke 1947: 169. Type species: *Solanophila chelonia* Mader 1933 (by original designation).—Pang and Mao 1979:

159, Jadwiszczak and Węgrzynowicz 2003: 208, Kovár 2007: 631, Szawaryn et al. 2015: 556, 565.

Diagnosis. *Epiverta* is easily recognizable genus of Epilachnini by the following combination of characters: antenna longer than head width with antennomeres 3–8 elongate; elytral lateral margins widely explanate; metaventrite and abdominal ventrite 1 without postcoxal lines; elytral epipleura with foveae for receiving tips of femora.

Description. Length 4.6–8.1 mm. Body (Fig. 44A and 83E) oval, convex, dorsum pubescent. Elytra orange to brown with brown and black maculae or stripes.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 43A) slightly longer than half length of gula. Antenna composed of 11 antennomeres, longer than head width; pedicel distinctly narrower than scape; antennomeres 3–8 elongate; club asymmetrical. Ventral and dorsal antennal grooves absent. Clypeus short,

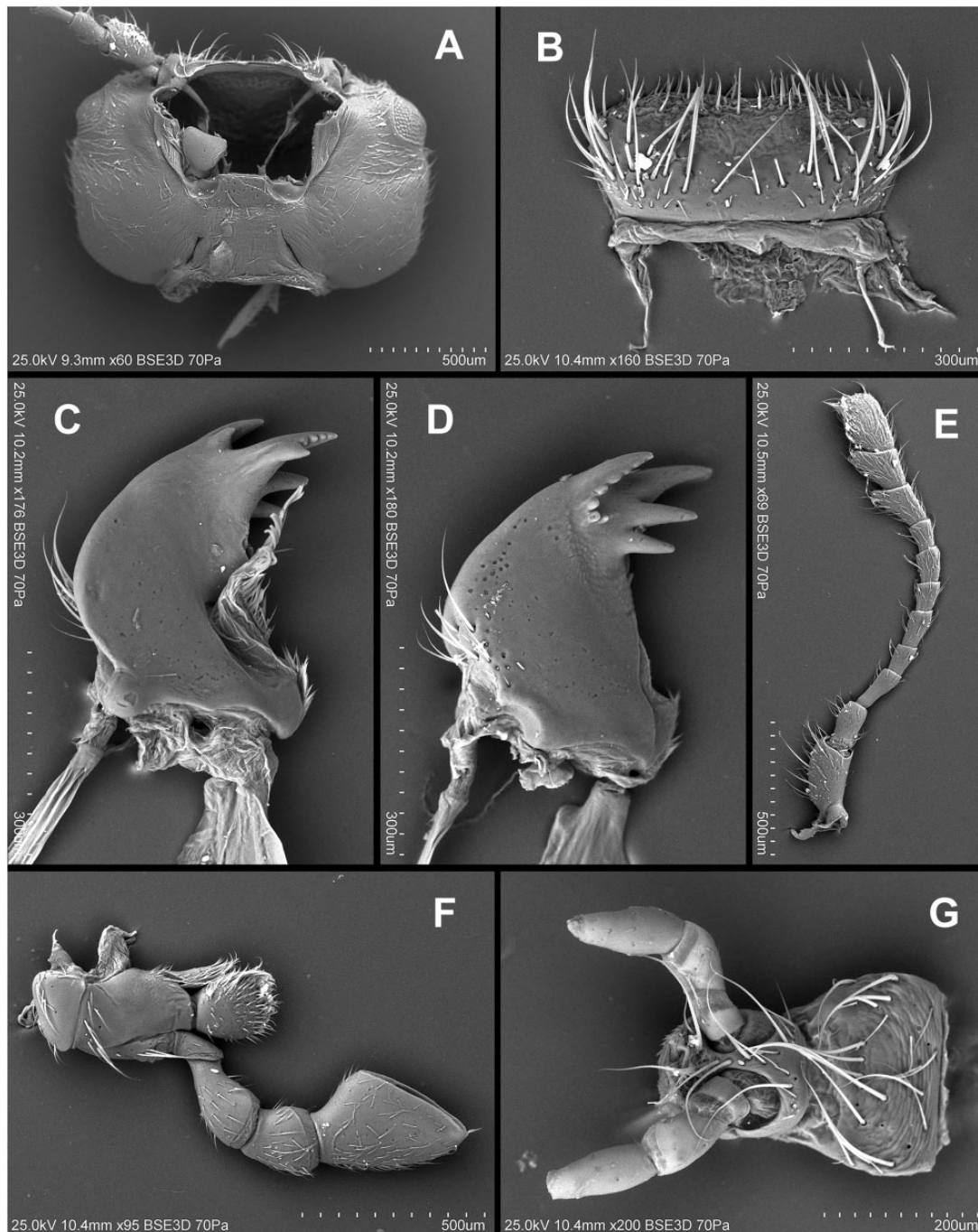


Fig. 43. *Eпивerta chelonіa* (Mader). (A) Head, ventral view; (B) Labrum; (C) Mandible, ventral view; (D) Mandible, dorsal view; (E) Antenna; (F) Maxilla; (G) Labium.

parallel-sided, its anterior margin straight, smooth without groove. Labrum (Fig. 43B) transverse, anterior margin emarginate. Mandible (Fig. 43C–D) multidentate apically; incisor edge without teeth, its surfaces smooth without tubercles, prostheca small. Maxilla (Fig. 43F) with cardo semicircular; stipes much longer than galea, in form of single sclerite with weak trace of suture visible; lacinia simple, its mesal surface simply setose; galea oval, about as long as wide, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere elongate, broadened apically. Submentum transverse with suture not clearly visible; mentum (Fig. 43G) less than two times broader than long, widest near base; prementum oval, ligula shortly setose; labial palps (Fig. 43G) separated by

distance distinctly less than width of palpiger; apical palpomere longer and about as broad as penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 44D) smooth, without carinae. Prosternum in front of coxa nearly as long as coxal longitudinal diameter, its anterior margin arcuate with weak projection anteriorly in median part. Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 44D–E) with anterior edge weakly emarginate posteriorly, without raised border; mesoventral process smooth; meso-metaventral suture somewhat sinuate. Inner edge of metanepisternum smooth. Scutellum triangular, transverse. Metendosternite tendons separated by slightly less than width of

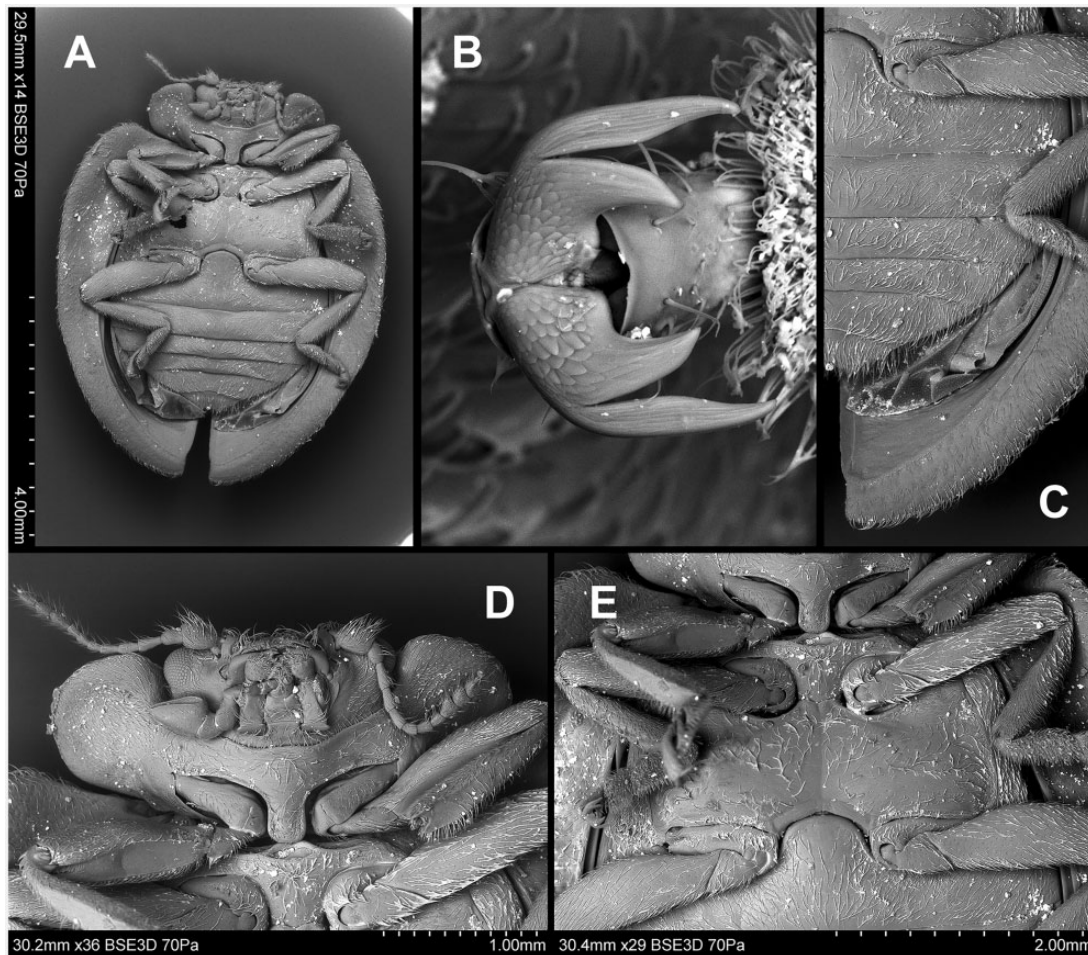


Fig. 44. *Epiverta chelonina* (Mader). (A) Body, ventral view; (B) Tarsal claws; (C) Abdomen, male, ventral; (D) Head and prothorax, ventral; (E) Meso- and meta-thorax, ventral, and abdominal ventrite 1.

stalk and placed on laminae. Elytra dually punctate; lateral margins explanate, entirely visible from above. Epipleuron (Fig. 44A and C) complete, with long shallow groove and foveae for receiving tips of femora, its inner margin without clear bordering line. Metaventral postcoxal lines absent (Fig. 44E).

Legs (Fig. 44A) slender with apices of mid and hind femora not protruding from outer margin of epipleuron. Fore and mid trochanters simple, without cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge smooth, without carina. Tibial spurs: 1-2-2. Tarsal claws (Fig. 44B) double, weakly swollen at base.

Abdomen (Fig. 45A and E). Six ventrites in both sexes. Abdominal postcoxal lines absent (Fig. 44C). In male: apical margin of ventrite 5 weakly emarginate (Fig. 45A); ventrite 6 emarginate (Fig. 45B); tergite VIII emarginate (Fig. 45C); apodeme of male sternum IX absent (Fig. 45D). Tergite X transverse, weakly emarginate at apex (Fig. 45D). In female: apical margin of ventrite 5 truncate (Fig. 45E); ventrite 6 (Fig. 45F) with simple, basal margin, subtruncate apically, longitudinally at middle not divided; tergite VIII (Fig. 45G) emarginate or rounded apically, with narrow transparent membrane in apical part. Posterior margin of proctiger emarginate.

Male genitalia (Fig. 45H–J). Tegminal basal piece without spines. Penis guide symmetrical, as long as parameres; outer edge broadened in apical part, with small, sharp tooth at apex. Parameres

well developed, broad, simple apically. Penis base with reduced T-shaped capsule.

Female genitalia (Fig. 45K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites long oval, distinctly less than two times longer than wide; outer edge of coxite free, ventral surface with sclerotized pocket/ridge antero-medially. Styli distinct. Bursa copulatrix without sclerite, simple, nondivided, with common oviduct emerging at base. Sperm duct originated apically on bursa copulatrix.

Distribution. China.

Species included (examined). *Epiverta chelonina** (Mader)—monotypic genus.

Afissa Dieke 1947
(Figs. 46–48 and 83A)

Afissa Dieke 1947: 113. Type species: *Coccinella flavicollis* Thunberg 1781 (by original designation). Synonymized with *Epilachna* Chevrolat in Dejean 1837, by Li and Cook 1961. Resurrected from synonymy by Szawaryn et al. 2015: 565.

Afissula Kapur 1958. Type species: *Afissula rana* Kapur 1958 (by original designation).—Jadwiszczak and Węgrzynowicz 2003: 25, Kovár 2007: 626, Ren et al. 2009: 254. Synonymized by Szawaryn et al. 2015: 565.

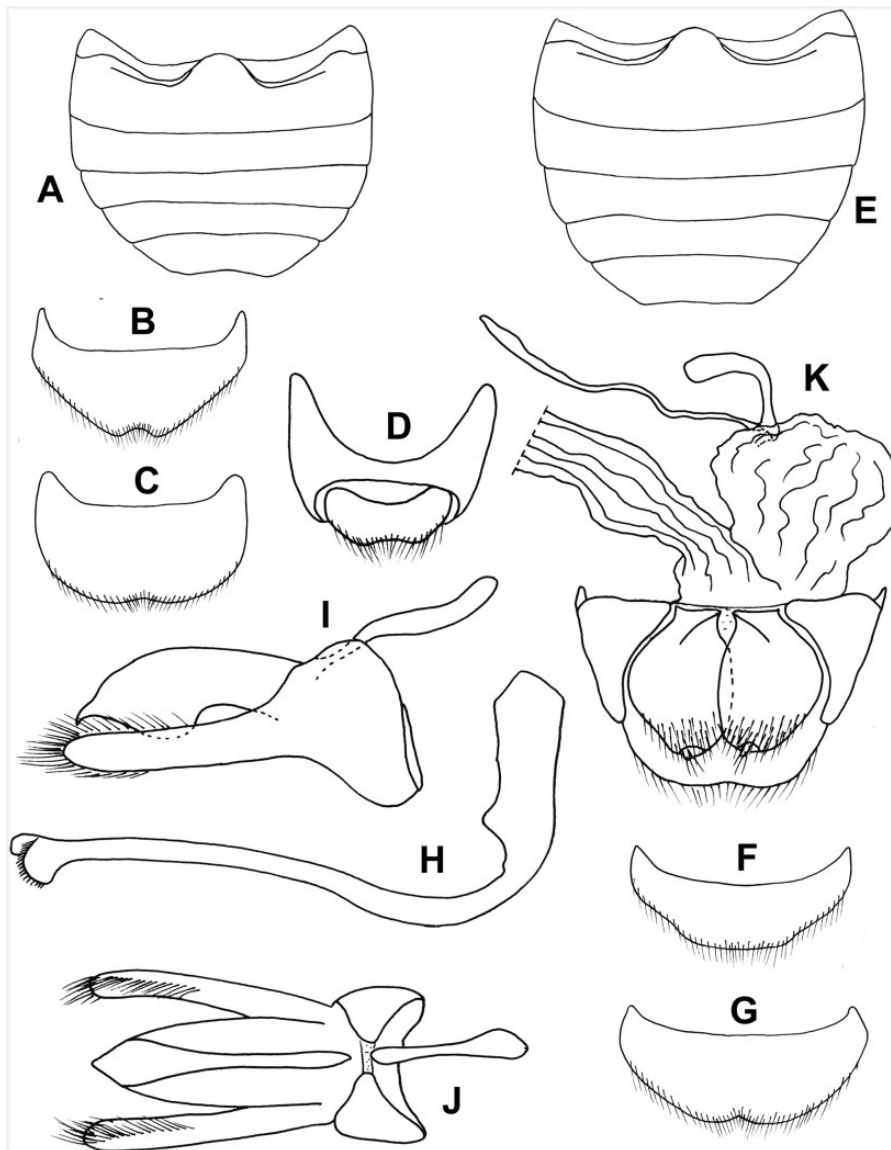


Fig. 45. *Epiverta chelonina* (Mader). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal ventrite 6, female; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Epilachna Chevrolat in Dejean 1837 (in part).—Szawaryn et al. 2015: 552, 556, 565.

Diagnosis. *Afissa* is most similar to *Afidentula*, *Afidenta* and some species of *Diekeana* and *Uniparodontata* (both genera derived from former *Epilachna*). However, the following combination of characters separate *Afissa* from all Asian and also from the remaining genera of Epilachnini: antenna longer than width of head; coxites much longer than wide; mandibular incisor edge without teeth; lateral margins of elytra most often not or hardly visible from above (sometimes visible from above but narrow); metanepisternum with inner margin simple, smooth; mid and hind coxae on hind margin smooth.

Description. Length 3.3–9.0 mm. Body (Fig. 47A and 83A) oval to elongate oval, convex, dorsum pubescent. Elytra yellow, orange or brown with black maculae or stripes, sometimes elytra black with yellow, orange, or red maculae.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 46A) shorter than half length of gula. Antenna (Fig. 46E) composed of 11 antennomeres, longer than head width; pedicel distinctly narrower than scape; antennomeres 3–8 elongate; club asymmetrical. Ventral and dorsal antennal grooves absent. Clypeus short, parallel-sided, its anterior margin weakly emarginate, smooth without groove. Labrum (Fig. 46B) transverse, truncate or weakly emarginate at apex. Mandible (Fig. 46C–D) multidentate apically; incisor edge somewhat roundly produced, without teeth, its surfaces smooth, prostheca well developed. Maxilla (Fig. 46F) with cardo quadrate to semicircular, reaching at most slightly outside of mouth cavity; stipes much longer than galea, with suture between basistipes and mediostipes well visible, or in form of single sclerite with trace of suture hardly visible; lacinia simple, with mesal surface simply setose, sometimes with patch of longer setae apically; galea oval, at least as long as wide, mostly sclerotized, its ventral surface at least

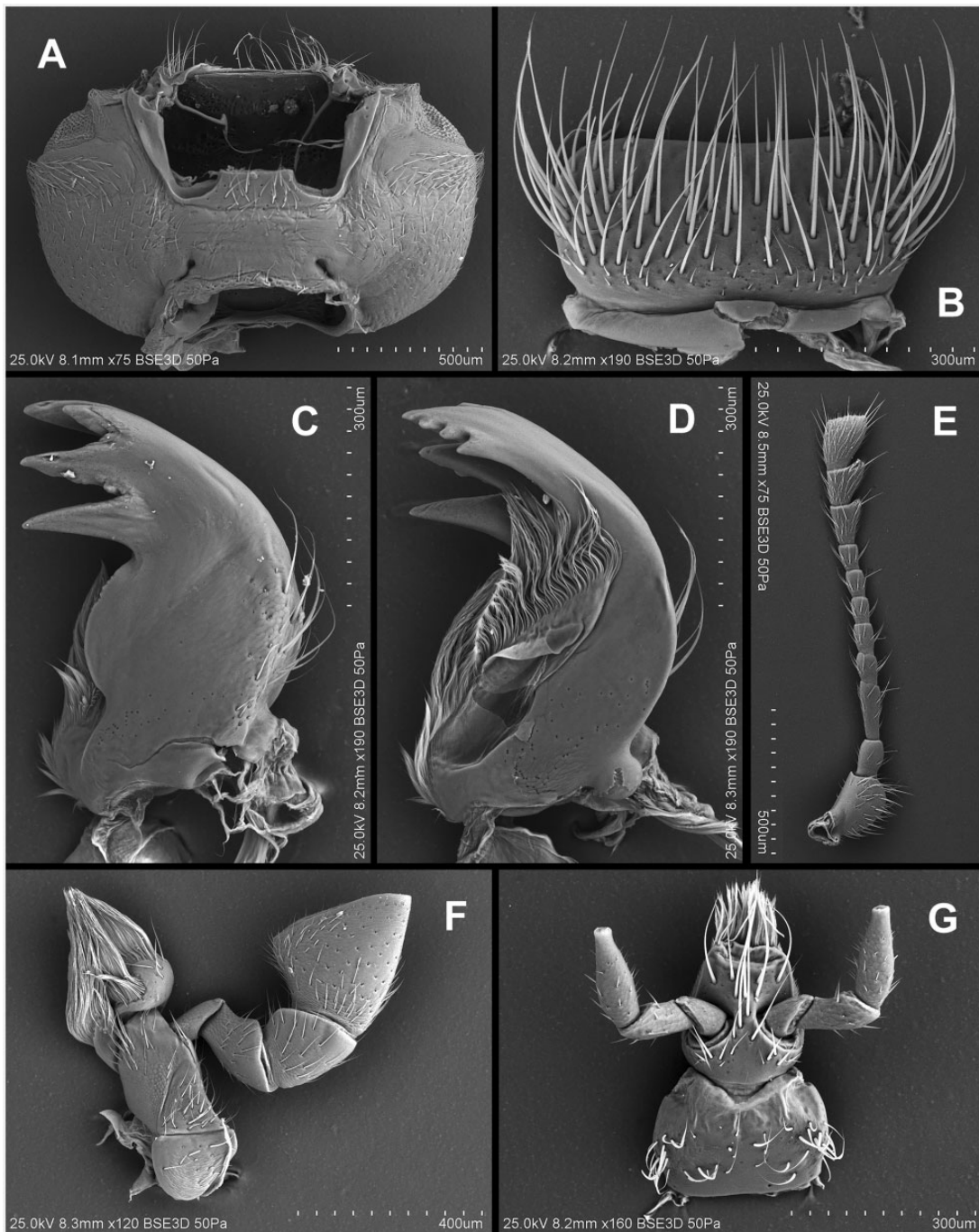


Fig. 46. *Afissa flavicollis* (Thunberg). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

sparsely pubescent, with long setae apically; terminal palpomere distinctly securiform or elongate, parallel-sided or weakly expanded apically. Submentum short, transverse or subquadrate with suture not clearly visible; mentum (Fig. 46G) less than two times broader than long, widest near median part; prementum oval, ligula covered with long or short setae; labial palps (Fig. 46G) separated by distance at least equal to width of palpiger, or rarely separated by distance distinctly less than width of palpiger; apical palpomere at least as long and about as broad as penultimate one.

Prothorax. Hypomerion simply/finely punctate (Fig. 47D). Prosternal process (Fig. 47D) smooth, without carinae or with

separate, short carinae. Prosternum in front of coxa usually shorter than half length of coxal longitudinal diameter or sometimes 0.5–1.0 length of coxal longitudinal diameter, its anterior margin weakly arcuate. Procoxal cavity without visible bordering line, or sometimes with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 47E) with anterior edge weakly emarginate, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, as long as broad, rarely shorter. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral

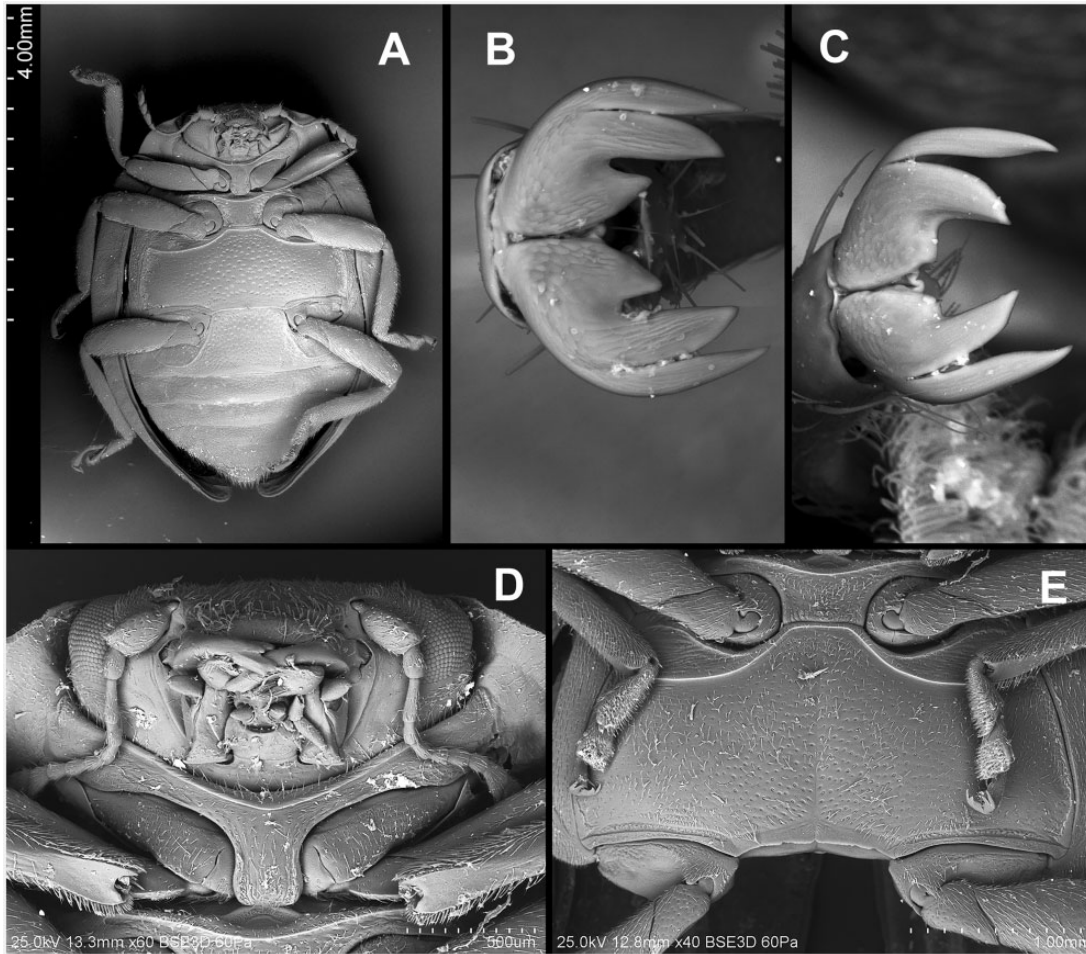


Fig. 47. (A, C) *Afissa sanscrita* (Crotch); (B) *Afissa uniformis* (Pang and Mao); (D, E) *Afissa flavicollis* (Thunberg). (A) Body, ventral view. (B, C) Tarsal claws. (D) Head and prothorax, ventral. (E) Meso- and metaventrite.

margins most often not or hardly visible from above, sometimes narrow but entirely visible from above. Epipleuron (Fig. 47A) incomplete apically, smooth or rarely with foveae for receiving tips of femora, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines (Fig. 47E) joined on metaventral process in straight line, laterally complete and distinctly recurved.

Legs (Fig. 47A) long and slender with apices of mid and hind femora protruding from outer margin of elytral epipleuron or rarely more stout and not protruding from outer margin of epipleuron. Fore and mid trochanters simple or roundly, or angulately produced with weak cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge smooth or with oblique carina near apex. Tibial spurs: 1-2-2. Tarsal claws double, smooth at base (Fig. 47C), or double with large basal tooth (Fig. 47B).

Abdomen. Six ventrites in males and five or six ventrites in females. Abdominal postcoxal lines (Fig. 48A and E) recurved roundly but incomplete laterally or sometimes complete, without additional line. In male: apical margin of ventrite 5 rounded, emarginate or truncate (Fig. 48A); ventrite 6 rounded, emarginate or truncate (Fig. 48B); tergite VIII rounded or weakly emarginate (Fig. 48C); apodeme of male sternum IX (Fig. 48D) rod-like, thin and long, rarely submembranous. Tergite X (Fig. 48D) large, subtriangular or transverse, rounded or emarginate at apex. In female: apical margin of

ventrite 5 (Fig. 48E) rounded, somewhat triangularly produced or truncate; sternite VIII (Fig. 48G) rounded or subtruncate (or ventrite 6 rounded), with basal margin simply arcuate, longitudinally at middle not divided; tergite VIII rounded (Fig. 48F). Proctiger (TX) large, elongate or subtriangular, rounded or arcuate apically.

Male genitalia (Fig. 48H-J). Tegminal basal piece without spines. Penis guide symmetrical, longer than parameres, at apex excised, emarginate or entire; outer edge smooth or at most setose; inner edge without additional process. Parameres well developed, thin or broad, sometimes broader at apex, simple apically, with long hair in apical part. Penis thin and long, sometimes curved at apex, its base sometimes with reduced T-shaped capsule.

Female genitalia (Fig. 48K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites much longer than wide, triangularly or regularly long-oval; outer edge of coxite free, inner edge simple—straight, ventral surface smooth. Styli reduced with one long seta on each. Bursa copulatrix without sclerite, divided in two pockets, one ending with common oviduct, the second blind, rarely ending with sperm duct and spermatheca.

Distribution. South and South-Eastern Asia.

Species included (examined): *Afissa ampliata* (Pang and Mao) **comb. nov.**, *A. anhweiana* Dieke, *A. antennata* (Bielawski) **comb. nov.**, *A. expansa* Dieke, *A. flavicollis** (Thunberg), *A. flavimarginalis* (Hoàng) **comb. nov.**, *A. gedeensis* Dieke, *A. max* (Pang and

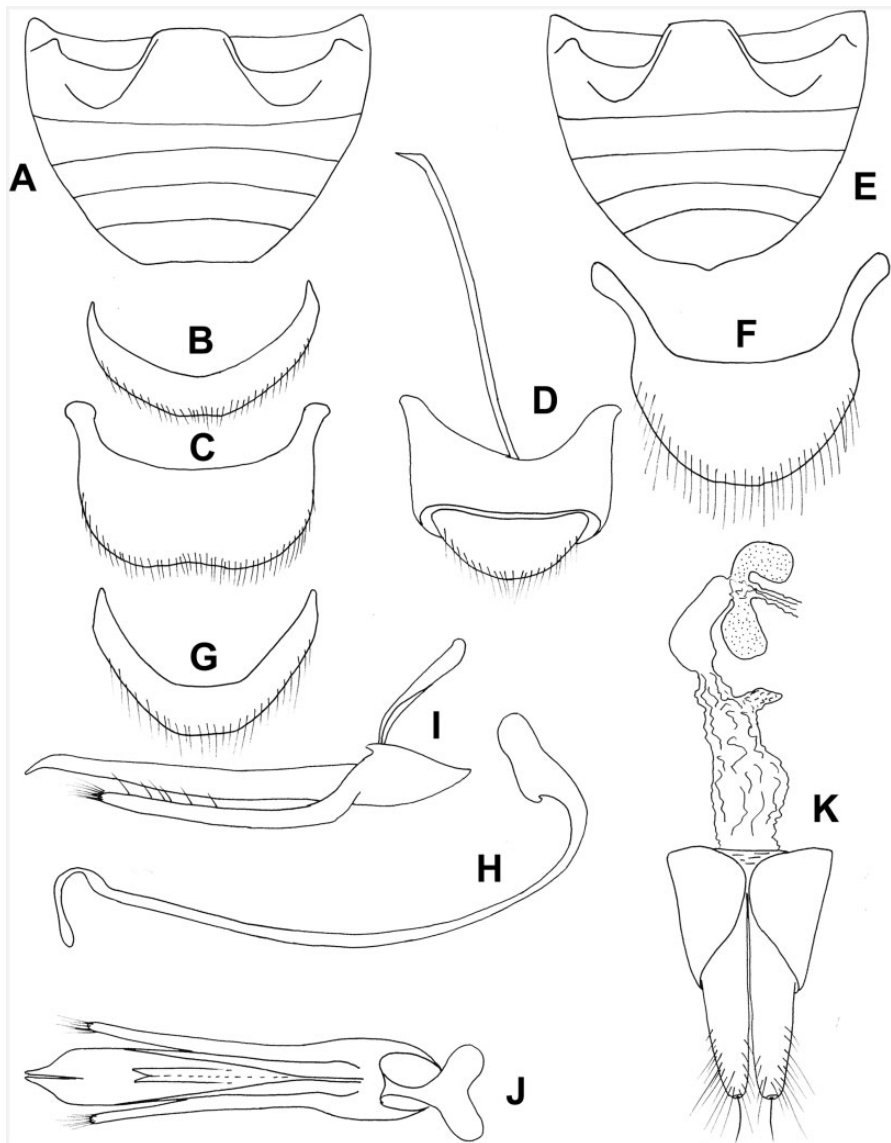


Fig. 48. *Afissa flavicollis* (Thunberg). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal tergite VIII, female, ventral; (G) Abdominal sternite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Ślipiński) **comb. nov.**, *A. parvula* (Crotch), *A. plicata* (Weise) **comb. nov.**, *A. rana* (Kapur) **comb. nov.**, *A. sanscrita* (Crotch) **comb. nov.**, *A. uniformis* (Pang and Mao) **comb. nov.**

Comment. Examined species belonged formerly to *Afissula* and to *fallax* and *flavicollis* groups of *Afissa* (Dieke 1947). Probably most of the species formerly classified in *Afissula* and Asian *Epilachna* belong to the genus *Afissa*.

Apart from the named/determined species, nine unnamed species of former Asian *Epilachna* and *Afissula* were examined (voucher specimens used in Szawaryn et al. 2015: E.sp_KS112, E.sp_KS215, E.sp_KS155, E.sp_KS175, E.sp_KS181, E.sp_KS204, E.sp_KS232, E.sp_KSL038, Af. sp_KS233).

Henosepilachna Li 1961
(Figs. 49–51)

Henosepilachna Li in Li and Cook 1961: 35. Type species: *Coccinella sparsa* Herbst 1786 (= *Coccinella vigintioctopunctata* Fabricius

1775) (by original designation).—Jadwiszczak and Węgrzynowicz 2003: 132, Kovár 2007: 629, Ren et al. 2009: 302, Szawaryn et al. 2015: 554, 560, 565.

Subafissa Bielawski 1963. Type species: *Epilachna papuensis* Crotch 1874.—Jadwiszczak and Węgrzynowicz 2003: 183. Synonymized by Szawaryn et al. 2015: 565.

Diagnosis. *Henosepilachna* resembles *Afidenta* but can be distinguished by mandibular incisor edge having distinct denticles or teeth, female ventrite 6 fully (or almost) divided longitudinally in the middle, tegminal basal piece with a pair of spines on inner margin near base of tegminal strut, parameres almost always ending with small internal teeth, and the styli of ovipositor always present although sometimes reduced and hardly visible.

Description. Length 4.6–9.3 mm. Body (Fig. 50A) oval, strongly convex, dorsum pubescent. Elytra usually orange to reddish-brown with black maculae, rarely forming stripes, sometimes elytra entirely black or with red maculae.

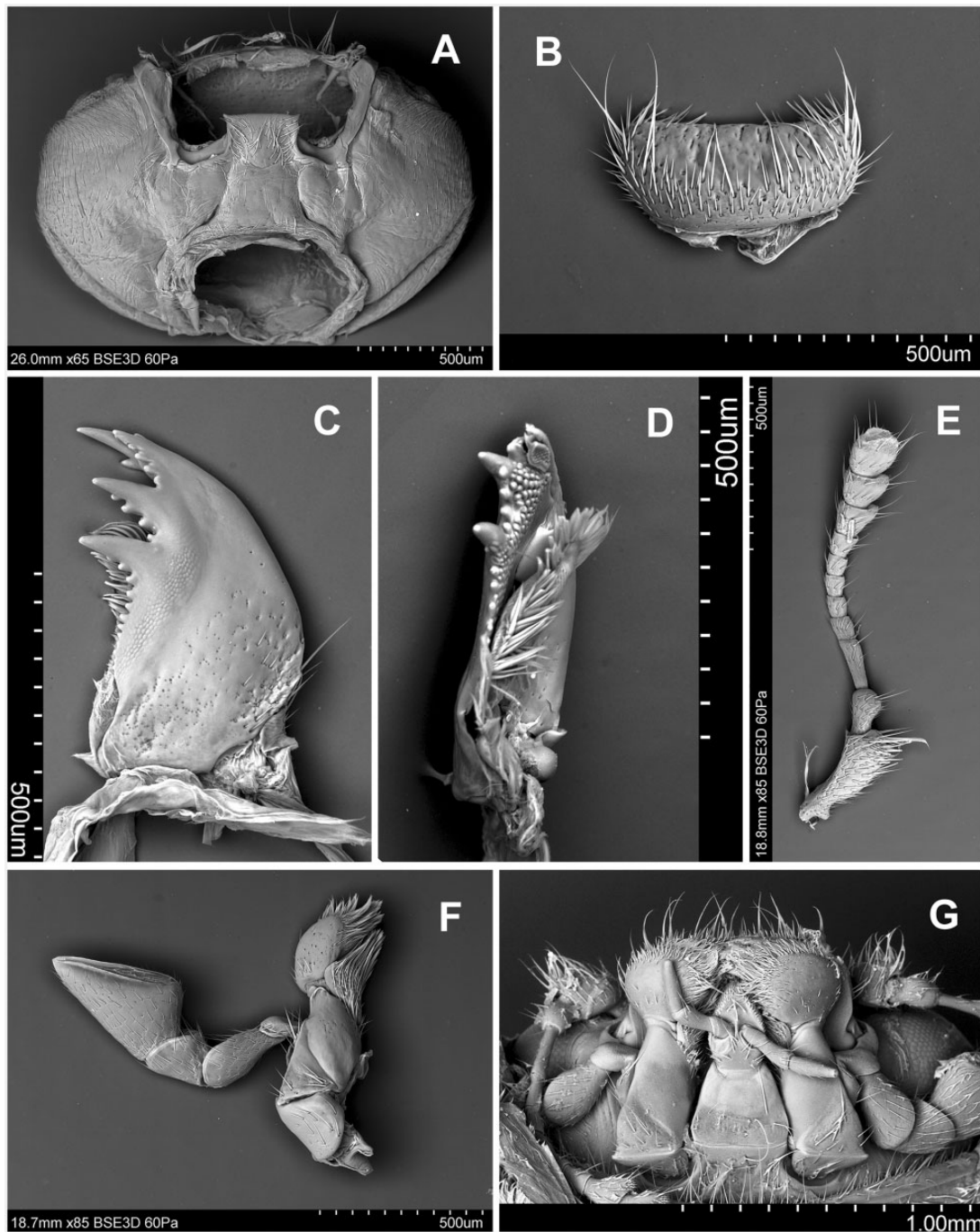


Fig. 49. *Henosepilachna vigintioctopunctata* (Fabricius). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, inner view; (E) Antenna; (F) Maxilla; (G) Ventral mouthparts.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Gular sutures (Fig. 49A) about half length of gula or longer than half length of gula. Antenna (Fig. 49E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 elongate, antennomeres 4–8 subquadrate or elongate; club asymmetrical. Ventral antennal grooves absent or sometimes short, straight, along inner margin of eye only. Dorsal antennal grooves absent. Clypeus parallel-sided, its anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 49B) transverse, anterior margin rounded, truncate, or emarginate. Mandible

(Fig. 49C–D) multidentate apically; incisor edge multidentate, its surfaces densely tuberculate or rarely smooth, prosthema well developed. Maxilla (Fig. 49F) with cardo quadrate to weakly transverse reaching at most slightly outside of mouth cavity; stipes much longer than galea, with suture between basistipes and mediostipes partly well visible, rarely in form of single sclerite with only weak trace of suture visible; lacinia simple, with mesal surface simply setose; galea transversely oval or as long as wide, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere elongate, broadened apically or sometimes securiform. Submentum transverse, with suture not clearly visible; mentum transverse, widest near base;

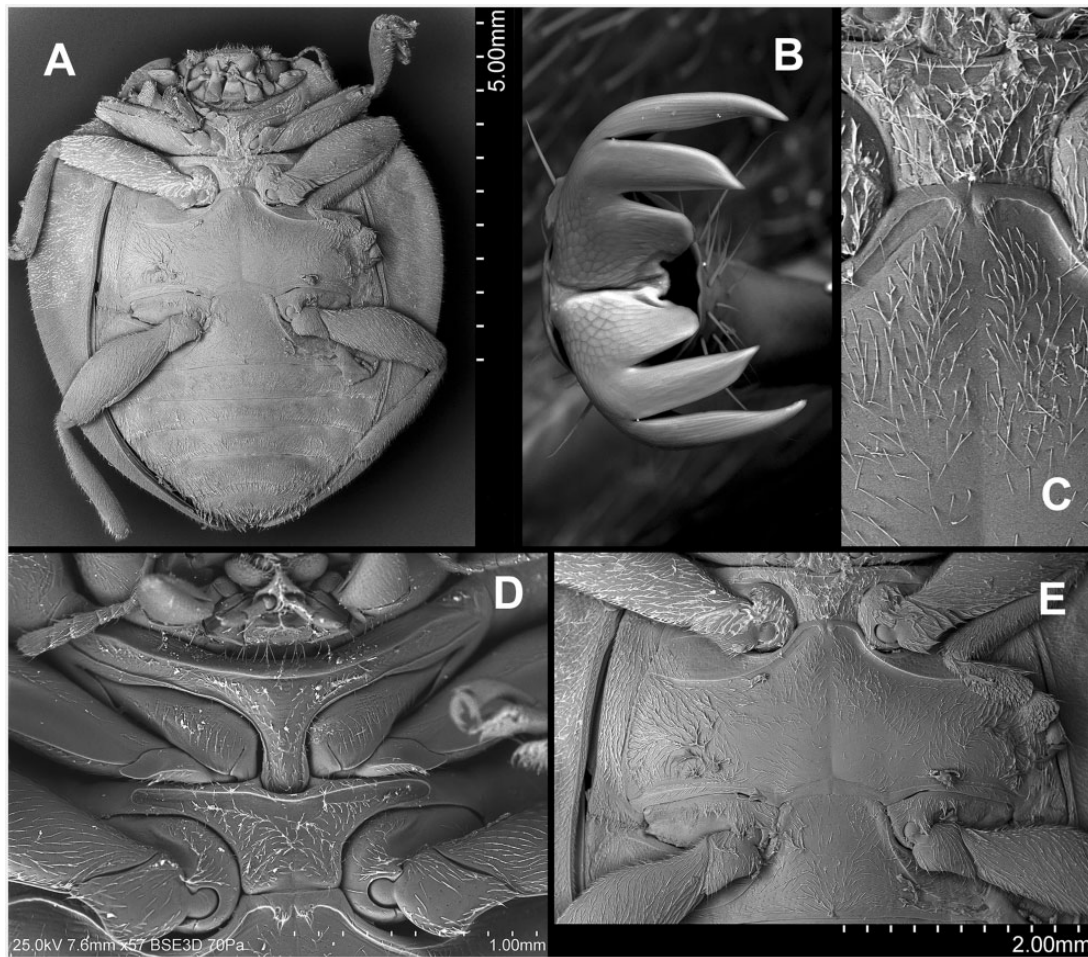


Fig. 50. *Henosepilachna tonkinensis* (Bielawski). (A) Body, ventral view; (B) Tarsal claws; (C) Meso-metaventral junction; (D) Pro- and mesothorax, ventral; (E) Meso- and metathorax, ventral, and abdominal ventrite 1.

prementum oval, ligula shortly setose; labial palps (Fig. 49G) separated by distance distinctly less than width of palpiger; apical palpmere at least as long and about as broad as penultimate one.

Prothorax. Hypomerion simply/finely punctate. Prosternal process (Fig. 50D) smooth, without carinae. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter or shorter than half length of coxal diameter, its anterior margin straight or arcuate. Procoxal cavity with bordering line, reaching laterally notosternal suture, or sometimes without visible bordering line.

Pterothorax. Mesoventrite (Fig. 50D–E) with anterior edge weakly emarginate, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite with tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins at least narrow but entirely visible from above. Epipleuron (Fig. 50A) incomplete apically, smooth, inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines joined or almost so on metaventral process in somewhat w-shaped line in middle (Fig. 50C), laterally complete and distinctly recurved or straight (Fig. 50E), sometimes descending.

Legs (Fig. 50A) slender with apices of mid and hind femora slightly protruding from outer margin of elytral epipleuron. Fore and mid trochanters roundly or angularly produced with cavities on their inner surfaces for receiving tips of tibiae in repose. Mid and

hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge smooth, without carina. Tibial spurs: 1-2-2. Tarsal claws (Fig. 50B) double with large basal tooth or sometimes double, smooth at base.

Abdomen. Six ventrites in both sexes. Abdominal postcoxal lines (Fig. 51A and E) recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 (Fig. 51A) truncate or weakly emarginate; ventrite 6 emarginate (Fig. 51B); tergite VIII truncate or rounded apically (Fig. 51C); apodeme of male sternum IX (Fig. 51D) rod-like, thin and long, rarely absent. Tergite X large, subtriangular with depression on dorsal site (Fig. 51D). In female: apical margin of ventrite 5 subtruncate (Fig. 51E); ventrite 6 (Fig. 51F) with simple, arcuate basal margin, longitudinally fully or almost divided along middle; tergite VIII truncate or emarginate at apex, rarely rounded (Fig. 51G). Proctiger (TX) simple, rounded or somewhat acutely produced at apex.

Male genitalia (Fig. 51H–J). Tegminal basal piece with a pair of spines on inner margin near base of tegminal strut. Penis guide symmetrical, usually hooked at apex, entire or rarely emarginate apically; outer edge smooth or serrate, or with additional processes, sometimes setose; inner edge without additional process. Parameres well developed ending with small internal teeth or rarely simple at apices, sometimes with additional process in about half length of paramera. Penis thin, straight and long, sometimes broad and curved with hook at apex, its base with T-shaped capsule.

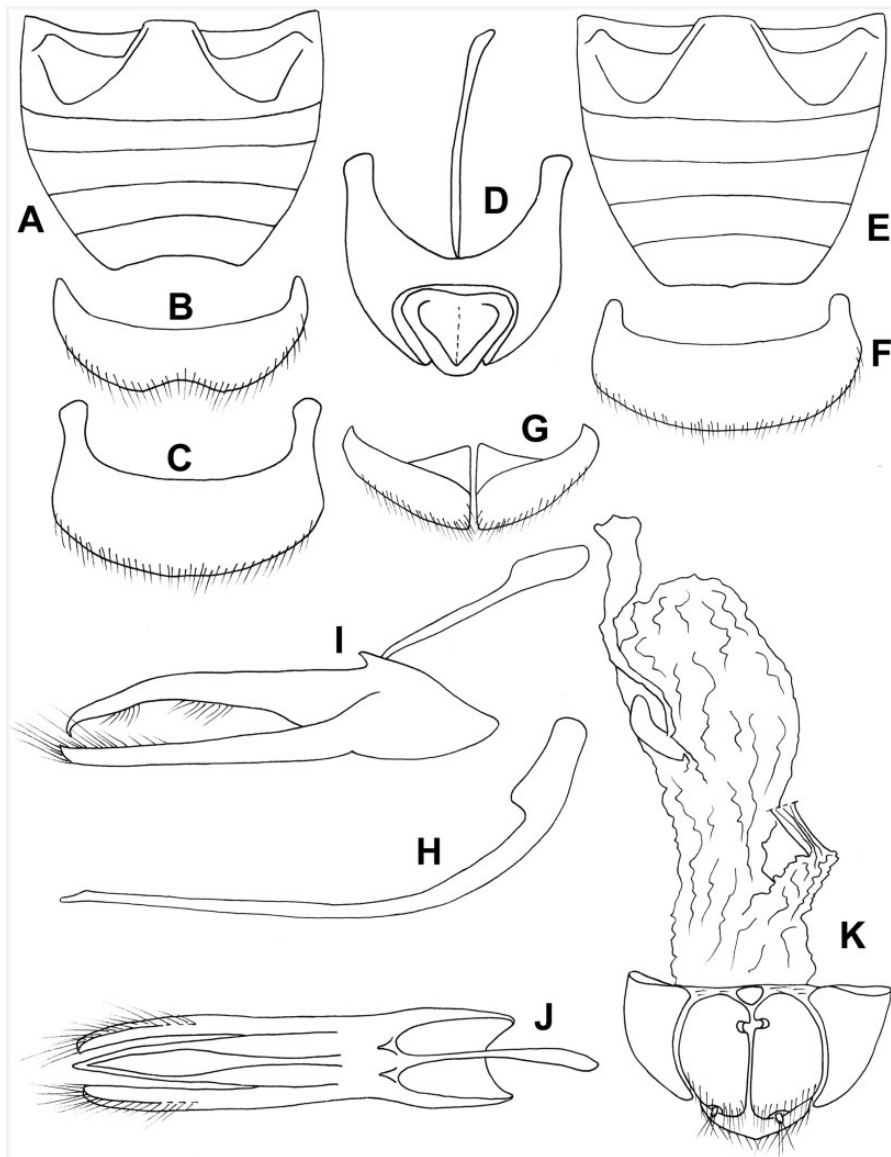


Fig. 51. *Henosepilachna vigintioctopunctata* (Fabricius). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal ventrite 6, female; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Female genitalia (Fig. 51K). Sclerite anteriorly to coxites in membrane connected paraprocts absent. Coxites distinctly less than two times longer than wide, oval, reniform; outer edge of coxite free, inner edge with small excision medio-basally or sometimes simple—straight, rounded, or weakly emarginate, ventral surface smooth or rarely with sclerotized pocket antero-medially. Styli distinct or sometimes strongly reduced and hardly visible. Bursa copulatrix without sclerite, nondivided, with common oviduct at base. Sperm duct originated ventrally or laterally on bursa.

Distribution. East Asia, South Asia, Oceania, Australia; *H. vigintioctopunctata* distributed all over the world in tropical and subtropical regions.

Species included (examined): *Henosepilachna altera* (Dieke), *H. brittoni* (Bielawski) **comb. nov.**, *H. eneastica* (Mulsant), *H. haemorrhoea* (Boisduval), *H. indistincta* (Dieke), *H. kabakovi* Hoang, *H. kaszabi* (Bielawski and Fürsch), *H. laokayensis* Hoang, *H. ocellata* (Redtenbacher), *H. papuensis* (Crotch) **comb. nov.**, *H. signatipennis*

(Boisduval), *H. tonkinensis* (Bielawski), *H. vigintioctomaculata* (Motschulsky), *H. vigintioctopunctata** (Fabricius).

Comment. Studied species belonged mostly to the *vigintioctopunctata*-group recognized by Dieke (1947), so it is most probable that all remaining species from this group will belong to *Henosepilachna*. Further research could also result in moving to this group, species not assigned to any species groups of former *Henosepilachna*.

Apart from the named/determined species, two unnamed species of *Henosepilachna* were examined (voucher specimens used in Szawaryn et al. 2015: KS015_H_sp., KS163_H_sp.

Afidenta Dieke 1947
(Figs. 52–54)

Afidenta Dieke 1947: 109. Type species: *Afidenta mimetica* Dieke 1947 (= *Epilachna misera* Weise 1901) (by original designation).—Jadwiszczak and Węgrzynowicz 2003: 15, Kovár

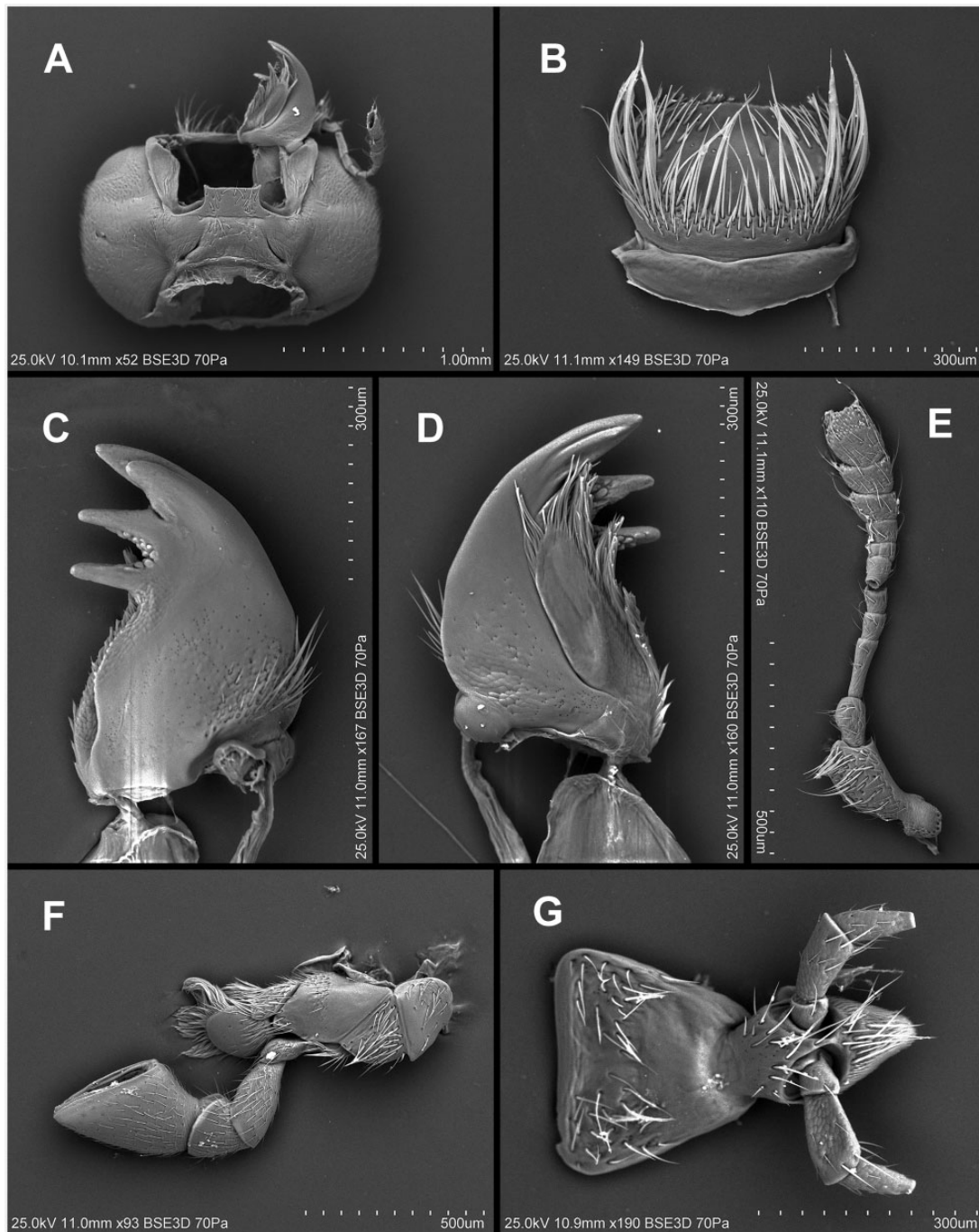


Fig. 52. *Afidenta misera* (Weise). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

2007: 625, Ren et al. 2009: 250, Szawaryn et al. 2015: 558, 565.

Diagnosis. *Afidenta* is most similar to *Afidentula*, *Afissa* and small members of the genus *Henosepilachna* by the general body shape and coloration. The following combination of characters will separate *Afidenta* from these and all other genera of Epilachnini: mandible slender with two subapical teeth and additional microdenticles or tubercles, ventral surface of incisor edge tuberculate, galea transversely oval, terminal labial palpomere as long as but distinctly narrower than penultimate one, metaventral postcoxal lines joined

on metaventral process, forming somewhat w-shaped line along discrimen, ventrite 6 in females not divided longitudinally and coxites without styli.

Description. Length 5.0–5.8 mm. Body (Fig. 53A) oval, strongly convex, dorsum pubescent. Elytra orange to reddish-brown with numerous black maculae.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 52A) as long as half length of gula. Antenna (Fig. 52E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3

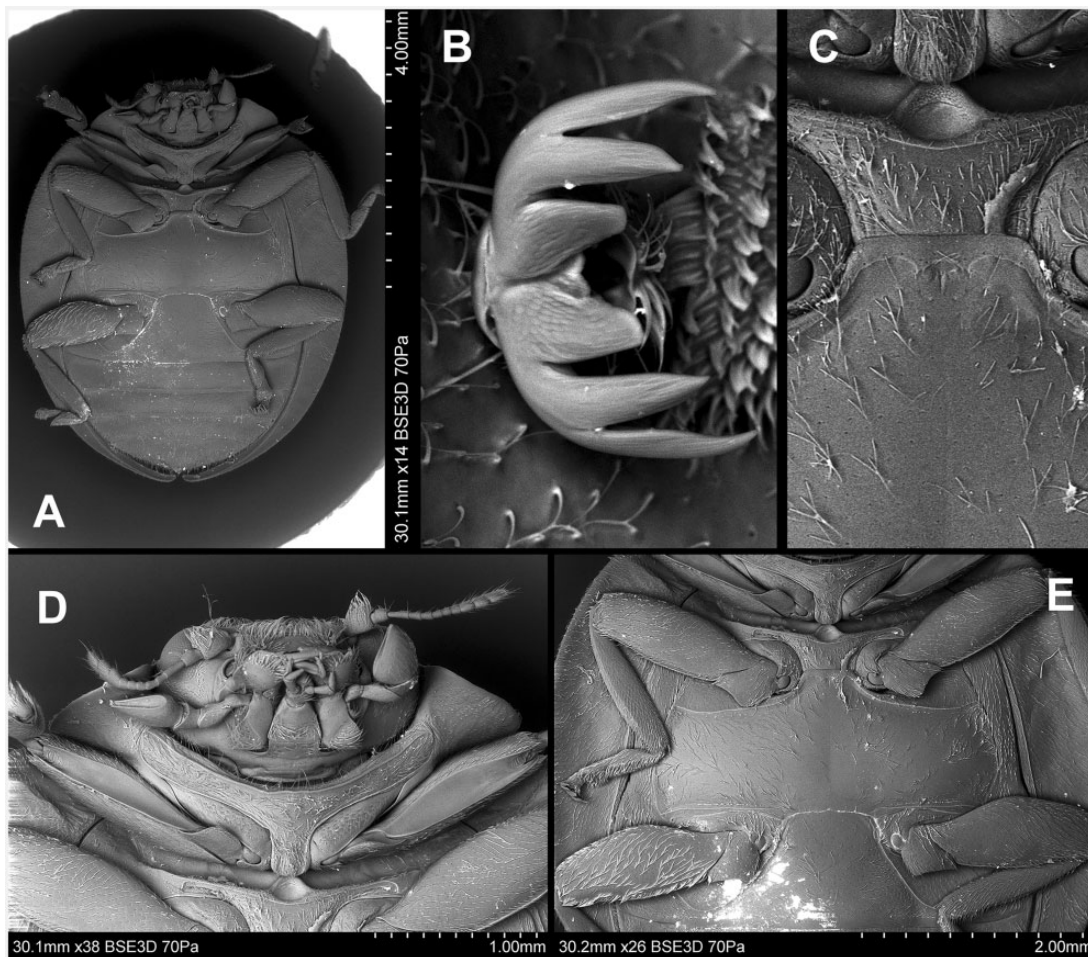


Fig. 53. *Afidenta misera* (Weise). (A) Body, ventral view; (B) Tarsal claws; (C) Meso-metaventral junction; (D) Head and prothorax, ventral; (E) Meso- and meta-thorax, ventral, and abdominal ventrite 1.

elongate; antennomeres 4–8 quadrate or at most weakly elongate; club asymmetrical. Ventral and dorsal antennal grooves absent. Clypeus transverse, short, parallel-sided, its anterior margin weakly emarginate, smooth without groove. Labrum (Fig. 52B) oval, transverse, moderately long, with anterior part membranous, truncate at apex. Mandible (Fig. 52C and D) multidentate apically; incisor edge with two large subapical teeth and additional micro-denticulation/tubercles on them and beyond them, basal part of incisor edge produced roundly inwards, its surfaces densely tuberculate, prosthema well developed. Maxilla (Fig. 52F) with cardo subquadrate, reaching at most slightly outside of mouth cavity; stipes much longer than galea, with suture between basistipes and mediostipes well visible; lacinia simple, its mesal surface simply setose; galea transversely oval, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere elongate, broadened apically. Submentum transverse, about twice as broad as long with suture well visible; mentum (Fig. 52G) less than two times broader than long, widest at base; prementum oval, ligula shortly setose; labial palps (Fig. 52G) separated by distance distinctly less than width of palpiger; apical palpomere as long as and distinctly narrower than penultimate palpomere.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 53D) smooth, without carinae, bordered laterally. Prosternum in front of coxa about as long as coxal longitudinal

diameter, its anterior margin uniformly arcuate. Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 53C and E) with anterior edge weakly emarginate, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite with tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins rather narrow but entirely visible from above. Epipleuron (Fig. 53A) incomplete apically, smooth, inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines joined on metaventral process in somewhat w-shaped line along discrimen (Fig. 53C), laterally complete and recurved or straight (Fig. 53E).

Legs (Fig. 53A) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters roundly produced. Mid and hind coxae simple; mid and hind femora swollen, simple along inner edge; mid and hind tibiae on outer edge smooth, without carina. Tibial spurs: 1-2-2. Tarsal claws (Fig. 53B) double with large basal tooth.

Abdomen. Six ventrites in both sexes. Abdominal postcoxal lines (Fig. 54A and D) recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 54A); ventrite 6 emarginate (Fig. 54B); tergite VIII rounded

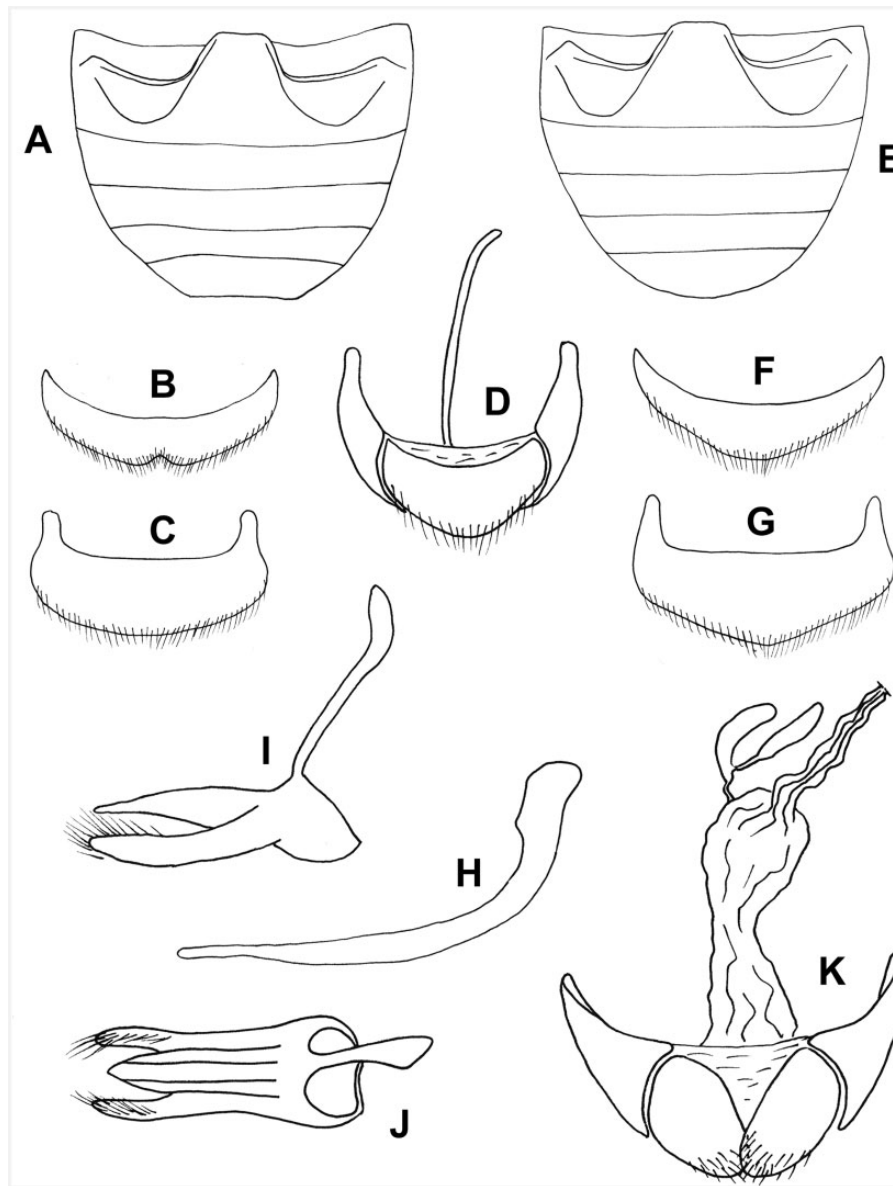


Fig. 54. *Afidenta misera* (Weise). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Abdomen, female, ventral; (E) Abdominal ventrite 6, female; (F) Abdominal tergite VIII, female, ventral; (G) Male genital segment; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

(Fig. 54C); apodeme of sternum IX (Fig. 54G) simple, rod-like. Tergite X subtriangular, rounded at apex. In female: apical margin of ventrite 5 rounded (Fig. 54D); ventrite 6 (Fig. 54E) arcuate, simply rounded at basal margin, longitudinally at middle not divided; tergite VIII (Fig. 54F) rounded at apex. Proctiger (TX) moderately large, arcuate apically.

Male genitalia (Fig. 54H–J). Tegminal basal piece without spines. Penis guide symmetrical, about as long as parameres, entire at apex; outer edge smooth; inner edge without additional process. Parameres well developed, simple apically, shortly setose at apex. Penis weakly curved, narrowing towards apex, its base with reduced T-shaped capsule.

Female genitalia (Fig. 54K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, reniform; outer edge of coxite free, inner edge simple—rounded, ventral surface smooth. Styli

absent. Bursa copulatrix without sclerite, simple, nondivided, ending with common oviduct. Sperm duct originated apically on bursa copulatrix.

Distribution. Asia: China, India, Indonesia, Nepal, Philippines, Sri Lanka, Taiwan, Vietnam.

Species included (examined): *Afidenta misera** (Weise)—monotypic genus.

Comment. A former genus *Afidenta* comprised 37 species from Africa and two species from Asia (with *A. misera* from Asia as the type species). According to analyses of Szawaryn et al. (2015), the African species of *Afidenta* formed a monophyletic group with *Afidentula*. The recent study of the second Asian species of former *Afidenta*, *A. siamensis* (Dieke) by Wang et al. (2015) resulted in placement of this species in the genus *Afidentula*. Therefore *Afidenta* includes presently only the type species.

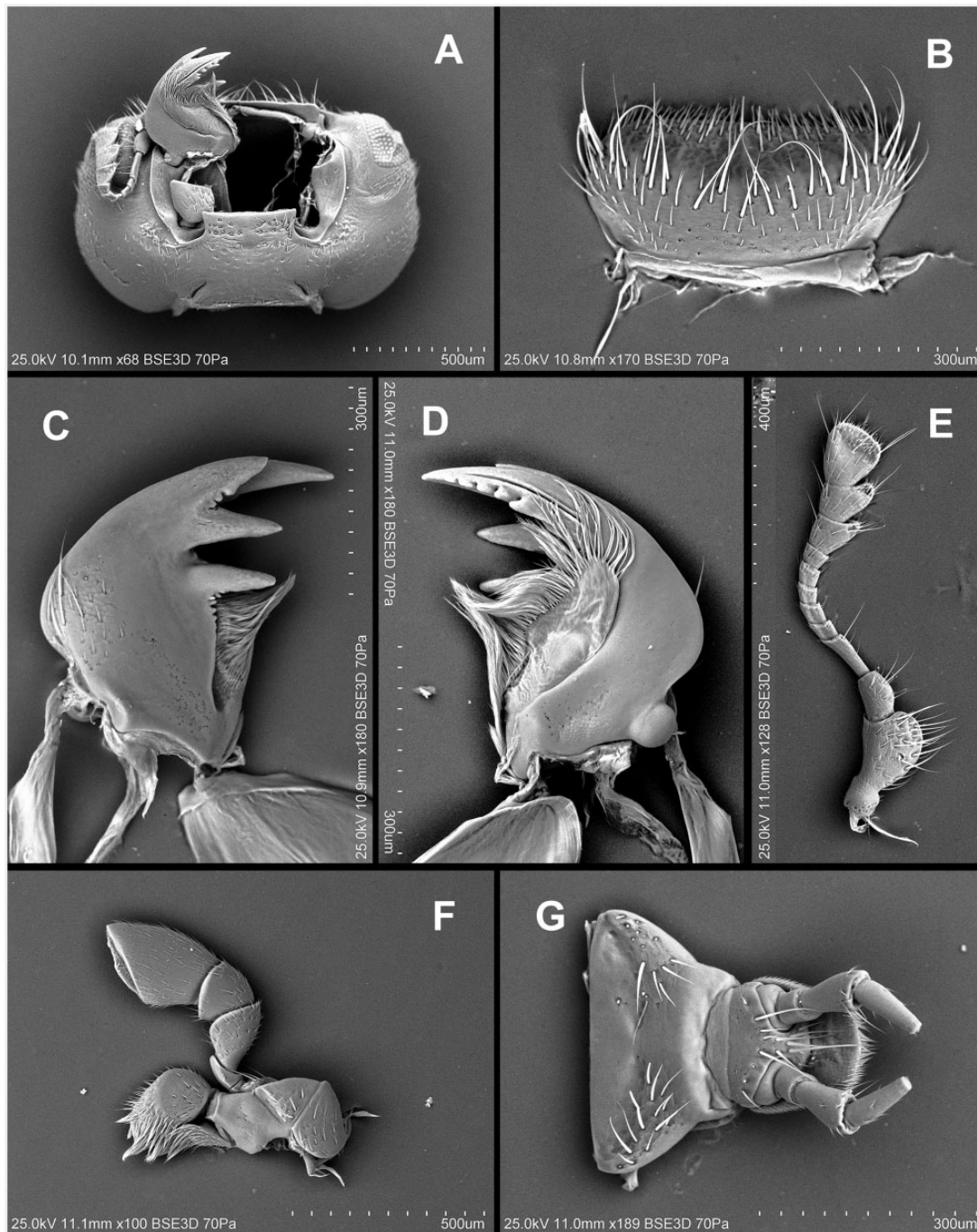


Fig. 55. *Merma limbata* Weise. (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

Merma Weise 1898
(Figs. 55–57)

Merma Weise 1898: 123. Type species: *Merma limbata* Weise 1898 (by subsequent designation of Korschefsky 1931).—Jadwiszczak and Węgrzynowicz 2003: 206, Szawaryn et al. 2015: 558, 565.

Diagnosis. *Merma* is quite easily recognizable genus of Epilachnini by the following combination of characters: double tarsal claws swollen at base, mid, and hind tibiae with oblique carina near apex, tibial spurs absent, the male genitalia with penis guide

possessing setose process on outer edge near mid length and tegminal basal piece with a pair of spines on inner surface near base of tegminal strut.

Description. Length 4.3–5.0 mm. Body (Fig. 56A) oval, strongly convex, dorsum pubescent. Elytra brown, sometimes covered with palier maculae, and sometimes with elytral margin and suture black.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 55A) shorter than half length of gula. Antenna (Fig. 55E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 elongate; antennomeres 4–7 subquadrate; antennomere 8 transverse; club

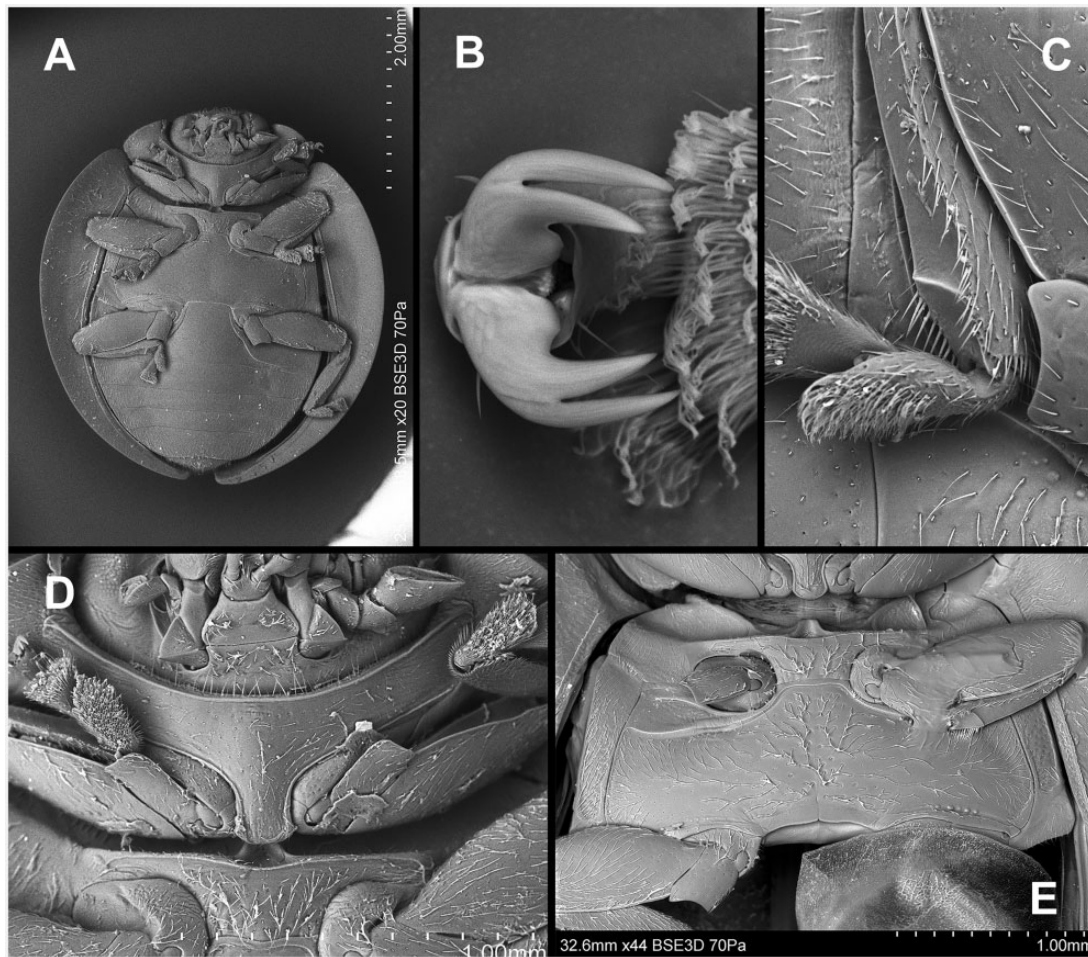


Fig. 56. *Merma limbata* Weise. (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia; (D) Pro- and mesothorax, ventral; (E) Meso- and metathorax, ventral.

asymmetrical. Ventral antennal grooves (Fig. 55A) short, straight, along inner margin of eye only. Dorsal antennal grooves absent. Clypeus parallel-sided, its anterior margin emarginate, with angles weakly produced anteriorly, smooth without groove. Labrum (Fig. 55B) transverse, moderately long, anterior margin emarginate, membranous. Mandible (Fig. 55C–D) multidentate apically; incisor edge with several denitcles in anterior part, its surfaces smooth without tubercles, prosthema well developed. Maxilla (Fig. 55F) with cardo semicircular; stipes much longer than galea, with suture between basistipes and mediostipes well visible; lacinia simple, its mesal surface simply setose; galea oval, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere at least weakly elongate, weakly expanded apically. Submentum transverse, two times broader than long with suture well visible; mentum (Fig. 55G) at least two times broader than long, widest near base; prementum oval, ligula covered with moderately long setae; labial palps (Fig. 55G) separated by distance less than width of palpiger; apical palpomere at least as long and distinctly narrower than penultimate one.

Prothorax. Hypomerion simply/finely punctate. Prosternal process (Fig. 56D) smooth, without carinae, bordered laterally. Prosternum in front of coxa about as long as coxal longitudinal diameter; anterior margin, uniformly arcuate. Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 56D–E) with anterior edge weakly emarginate, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight or weakly sinuate.

Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins narrow but entirely visible from above. Epipleuron (Fig. 56A) smooth, inner margin with bordering line nearly complete, fading before base of elytron. Metaventral post-coxal lines (Fig. 56E) joined on metaventral process in straight or arcuate line, laterally complete, descending.

Legs (Fig. 56A) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters roundly or angulately produced, with cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 56C). Tibiae without distinct spurs. Tarsal claws (Fig. 56B) double, swollen at base.

Abdomen. Six ventrites in males and five in females. Abdominal postcoxal lines (Fig. 57A and E) recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 broadly emarginate (Fig. 57A); ventrite 6 emarginate (Fig. 57B); tergite VIII rounded (Fig. 57C); apodeme of sternum IX (Fig. 57D) rod-like, long, narrow. Tergite X subtriangular (Fig. 57D). In female: apical margin of ventrite 5 rounded (Fig. 57E); sternite VIII (Fig. 57F) rounded apically, simply arcuate at base, longitudinally at middle not divided; tergite VIII rounded (Fig. 57G). Proctiger (TX) large, longer than wide, truncate at apex.

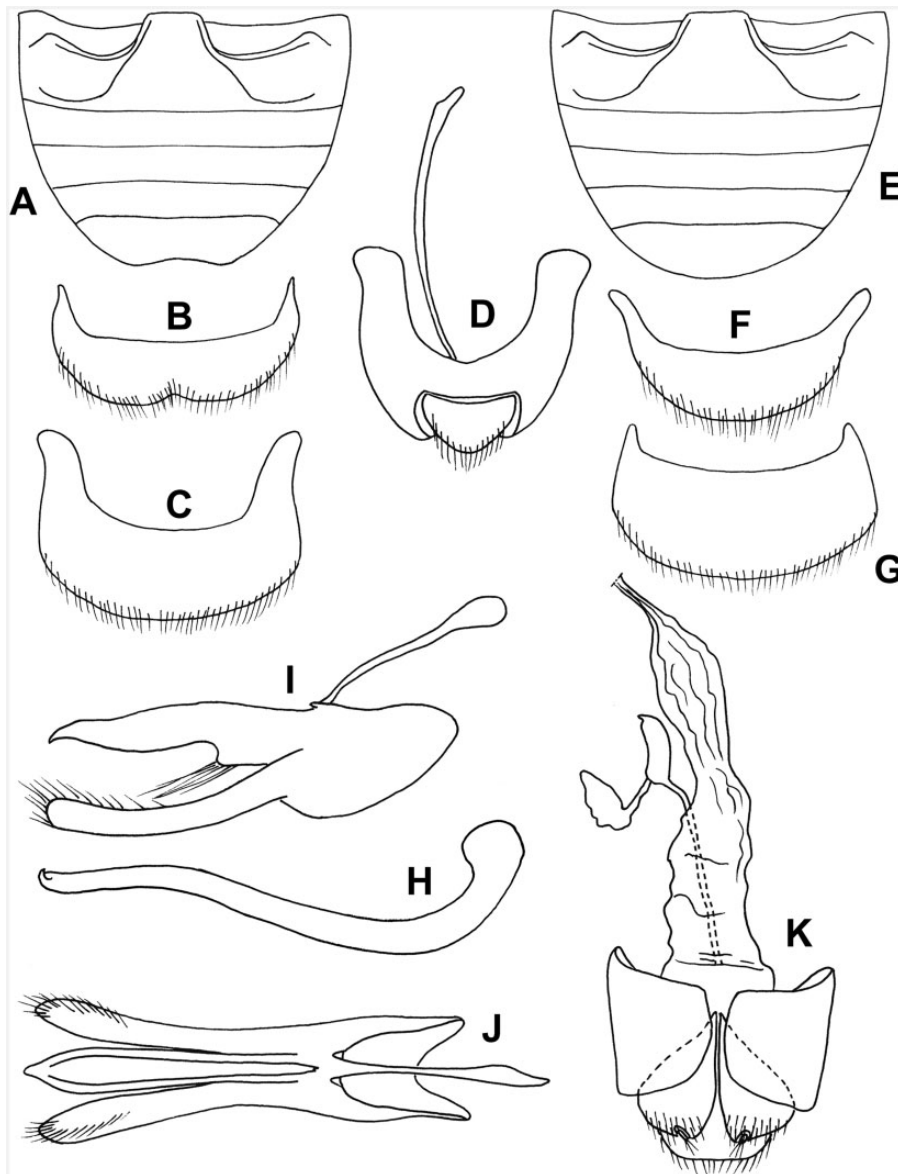


Fig. 57. *Merma limbata* Weise. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Male genitalia (Fig. 57H–J). Tegminal basal piece with a pair of spines on inner margin near base of tegminal strut. Penis guide symmetrical, as long as parameres, entire at apex; outer edge with setose process near middle length; inner edge without additional process. Parameres well developed, simple apically. Penis rod-like, slightly sinuate, with hook-like projection at apex and with reduced T-shaped, basal capsule.

Female genitalia (Fig. 57K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, subtriangular or drop-like; outer edge of coxite free, inner edge simple—straight, ventral surface smooth. Styli distinct. Bursa copulatrix without sclerite, simple, nondivided, ending with common oviduct. Sperm duct long, originated at base, dorsally on bursa.

Distribution. Africa: Cameroon, Republic of the Congo, République de Côte d'Ivoire, Uganda.

Species included (examined). *Merma limbata** Weise, *M. meditata* Kapur, *M. spilota* Weise.

Comment. Jadwiszczak and Węgrzynowicz (2003) listed four species of *Merma*.

Cynegetis Chevrolat 1837
(Figs. 58–60)

Cynegetis Chevrolat in Dejean 1837: 461. Type species: *Coccinella impunctata* Linnaeus 1767 (by subsequent designation of Crotch 1874).—Jadwiszczak and Węgrzynowicz 2003: 193, Kovár 2007: 625, Szawaryn et al. 2015: 557, 565.

Cynegetis (sic!) Crotch 1874: 90.

Diagnosis. *Cynegetis* resembles *Subcoccinella* in general shape of the body, similar genitalia of both sexes and interocular distance of more than 0.75 width of head. It, however, can be distinguished

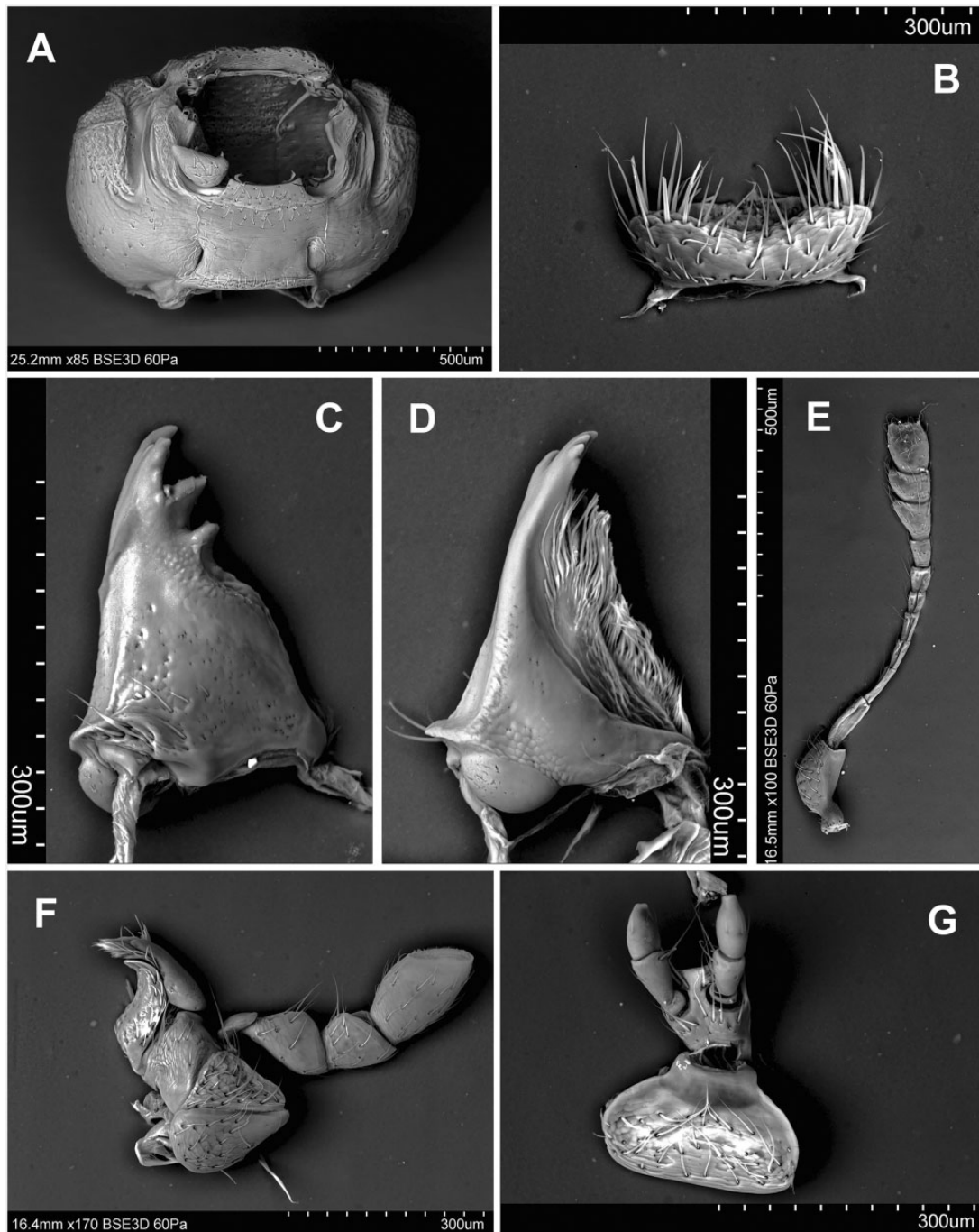


Fig. 58. *Cynegetis impunctata* (Linnaeus). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

from *Subcoccinella* by having the body strongly convex, anterior margin of clypeus distinctly emarginate, subapical teeth and incisor edge of mandible without denticles, the terminal maxillary palpomere barrel shaped, elytral surface dually punctate, elytral epipleuron with distinct foveae, outer edges of front tibiae strongly expanded/inflated and tarsal claw single provided with large basal tooth.

Description. Length 3.0–4.0 mm. Body (Fig. 59A) short oval, strongly convex, dorsum densely pubescent. Elytra yellowish brown with black maculae or transverse bands, sometimes uniformly colored.

Head. Interocular distance more than 0.75 head width (Fig. 59D). Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 58A) shorter than half length of gula. Antenna (Fig. 58E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 strongly elongate; antennomeres 4–8 at least 1.5 times longer than broad; club asymmetrical. Ventral antennal grooves (Fig. 58A) long, straight, reaching distinctly behind eyes. Dorsal antennal grooves absent. Clypeus parallel-sided, its anterior margin slightly emarginate, smooth without groove. Labrum (Fig. 58B) transverse, apical margin emarginate, membranous. Mandible (Fig. 58C–D) multidentate

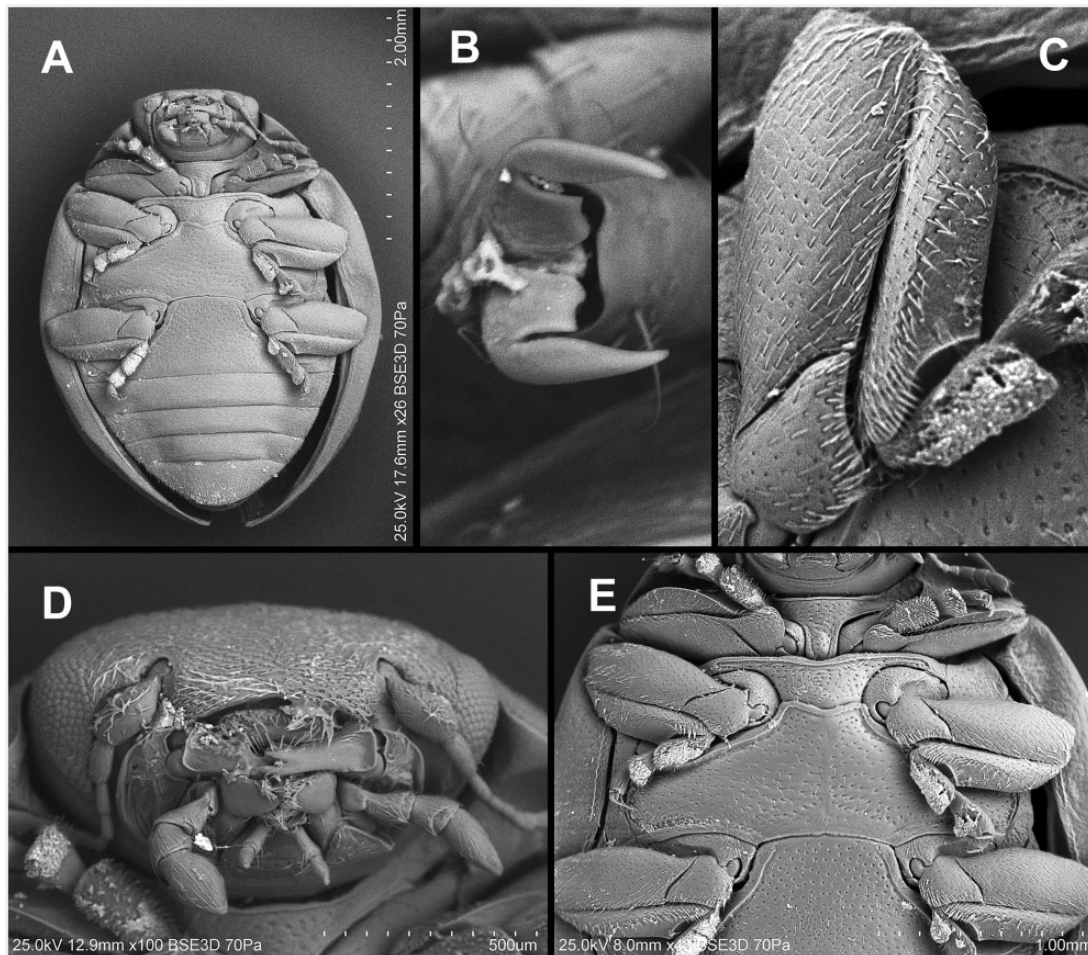


Fig. 59. *Cynegetis impunctata* (Linnaeus). (A) Body, ventral view; (B) Tarsal claws; (C) Mid leg; (D) Head, anterior view; (E) Pro-, meso-, and metathorax, ventral, and abdominal ventrite 1.

apically; incisor edge without teeth, its surfaces smooth or at most with weak tubercles, prostheca well developed. Maxilla (Fig. 58F) with cardo semicircular; stipes longer than galea, with suture between basistipes and mediostipes well visible; lacinia hook-like or simple, its mesal surface simply setose; galea oval, about as long as wide, mostly sclerotized, its ventral surface glabrous; terminal palpomere elongate, subcylindrical. Submentum transverse, about three times broader than long with suture rather distinct; mentum (Fig. 58G) transverse, at least two times broader than long, widest near middle length; prementum somewhat rectangular or oval, truncate anteriorly, ligula sclerotized, without setae. Labial palps (Fig. 58G) separated by distance less than width of palpiger; apical palpomere about as long and as broad as penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 59E) with weak lateral grooves. Prosternum in front of coxa shorter than half length or 0.5–1.0 length of coxal longitudinal diameter, its anterior margin weakly arcuate. Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 59E) with anterior edge weakly emarginate posteriorly or almost straight, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture emarginate posteriorly or straight. Inner edge of metanepisternum smooth. Scutellum triangular, transverse. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae.

Elytra dually punctate, two types of punctures of almost the same size; lateral margins not or hardly visible from above. Epipleuron (Fig. 59A) incomplete apically, with foveae for receiving tips of femora, inner margin with bordering line nearly complete, fading before base of elytron. Wings present or absent. Metaventral postcoxal lines joined on metaventral process in straight or arcuate line, laterally complete and distinctly recurved.

Legs (Fig. 59A and E) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters roundly or angulately produced with deep cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 59C). Tibial spurs: 1-2-2. Tarsal claws single with subquadrate tooth at base (Fig. 59B).

Abdomen. Six ventrites in males and five in females. Abdominal postcoxal lines (Fig. 60A and E) recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 subtruncate (Fig. 60A); ventrite 6 emarginate (Fig. 60B); tergite VIII rounded (Fig. 60C); apodeme of sternum IX stout, rod-like (Fig. 60D). Tergite X transverse, truncate at apex. In female: apical margin of ventrite 5 arcuate (Fig. 60E); sternite VIII (Fig. 60F) rounded, longitudinally not divided; tergite VIII rounded (Fig. 60G). Proctiger (TX) rounded or emarginate at apex (Fig. 60K).

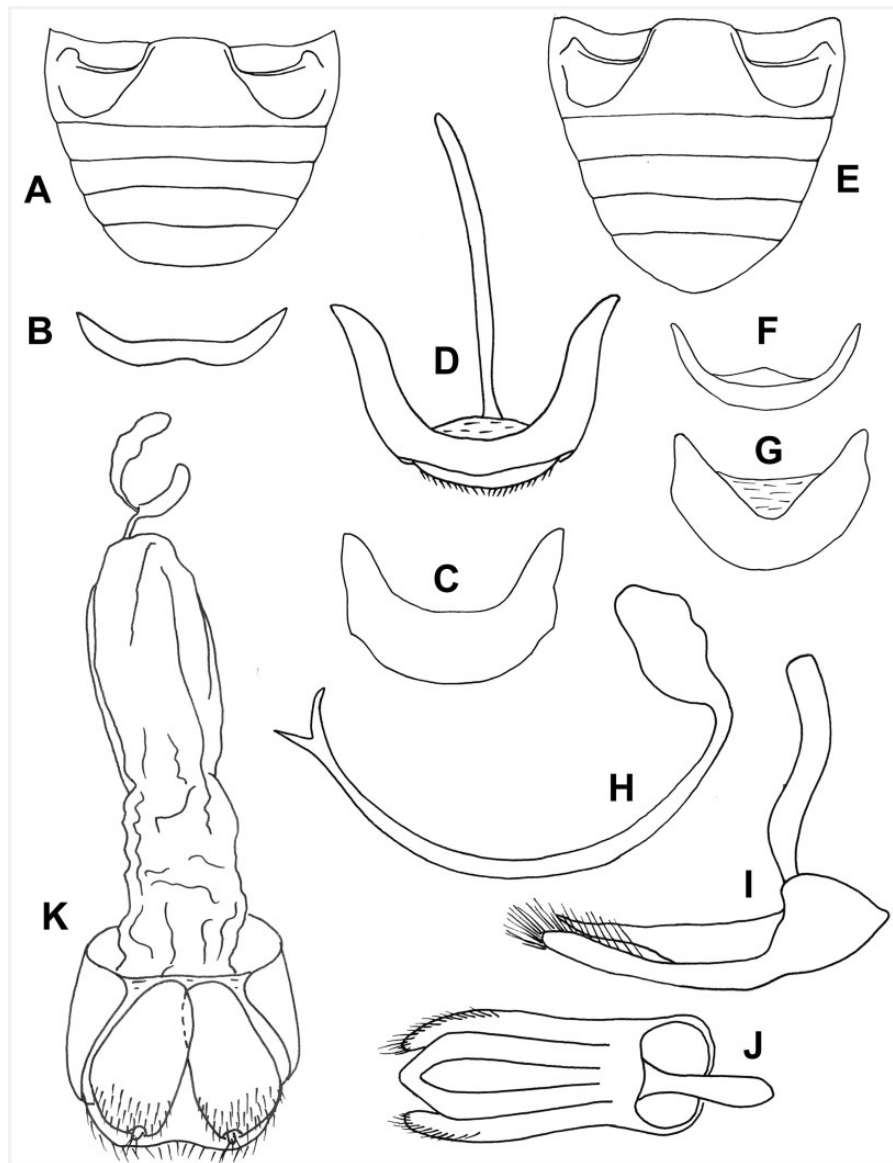


Fig. 60. *Cynegetis impunctata* (Linnaeus). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Male genitalia (Fig. 60H–J). Tegminal basal piece without spines. Penis guide symmetrical, about as long as parameres, at apex entire; outer edge smooth; inner edge without additional process. Parameres well developed, simple apically. Penis base with T-shaped capsule arms reduced.

Female genitalia (Fig. 60K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, elongate oval; outer edge of coxite free, inner edge simple—straight or rounded, ventral surface smooth. Styli distinct or absent. Bursa copulatrix simple, nondivided, with common oviduct at base. Sperm duct originated apically on bursa copulatrix.

Distribution. Palaearctic Region.

Species included (examined). *Cynegetis chinensis* Wang and Ren, *C. impunctata** (Linnaeus), *C. syriaca* (Mader).

Comment. All known species were studied (see Wang et al. 2014).

Macrolasia Weise 1903
(Figs. 61–63 and 83F)

Macrolasia Weise 1903: 230. Type species: *Macrolasia arcula* Weise 1903 (by monotypy).—Jadwiszczak and Węgrzynowicz 2003: 183, Szawaryn and Tomaszewska 2014: 578 (redescription), Szawaryn et al. 2015: 557, 565.

Diagnosis. *Macrolasia* is most similar to *Subcoccinella* in the general color pattern, presence of the apical tibial spurs and oblique carina near the apices of the mid and the hind tibiae. *Macrolasia*, however, can be distinguished by having clypeus with weakly raised anterior border, incisor edge of the mandibles without denticles, mentum strongly transverse, metaventral post-coxal lines widely separated on metaventral process, elytra dually punctate and male and female genitalia of different structure.

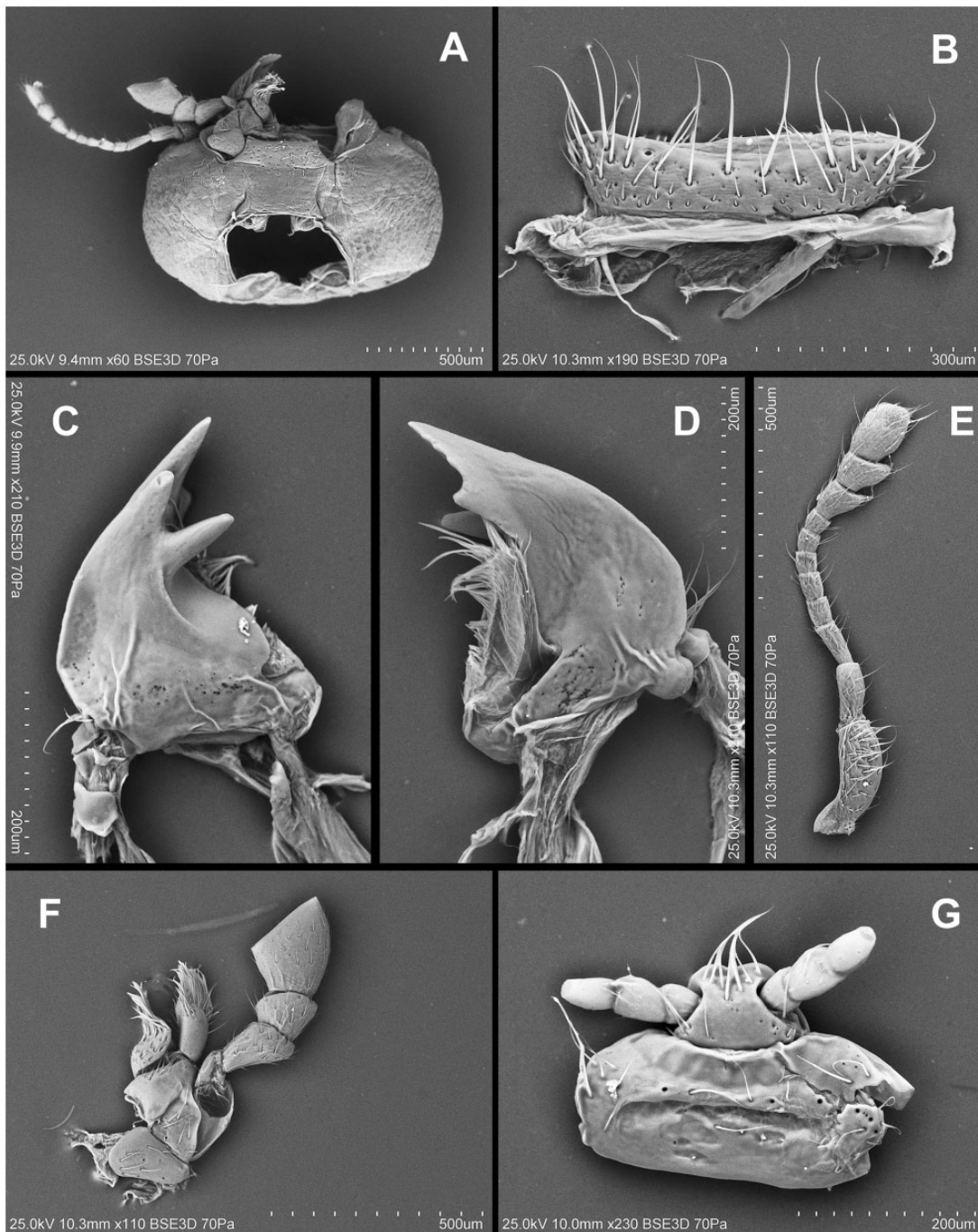


Fig. 61. *Macrolasia arcula* Weise. (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

Description. Length 4.4–5.0 mm. Body (Fig. 62A and 83F) oval, convex, dorsum pubescent. Elytra yellow to orange with several (usually five) black maculae.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 61A) shorter than half length of gula. Antenna (Fig. 61A and E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel about as broad as scape; antennomeres 3–5 elongate; antennomeres 6–8 subquadrate; club asymmetrical. Ventral and dorsal antennal grooves absent. Clypeus very short, parallel-sided, its anterior margin straight, with distinct groove just beyond

anterior edge. Labrum (Fig. 61B) short, transverse, weakly broadly emarginate, with anterior margin membranous. Mandible (Fig. 61C–D) multidentate apically; incisor edge produced, without teeth, its surfaces smooth without tubercles, prostheca well developed. Maxilla (Fig. 61F) with cardo semicircular; stipes much longer than galea, with suture between basistipes and mediostipes partly well visible; lacinia simple, its mesal surface simply setose; galea weakly elongate, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere weakly elongate, expanded apically. Submentum (Fig. 61A) transverse, about two times broader than long, with suture visible only laterally; mentum (Fig. 61G) strongly

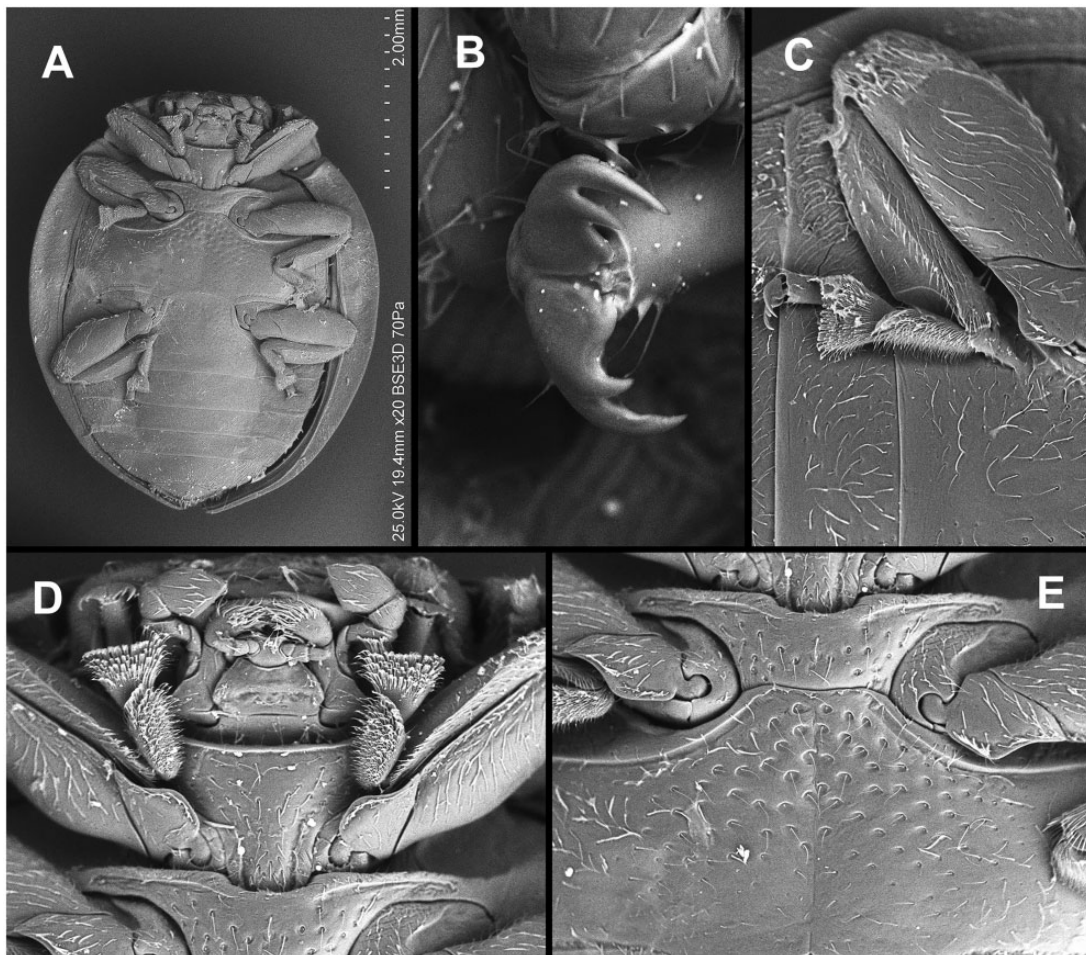


Fig. 62. *Macrolasia arcula* Weise. (A) Body, ventral view; (B) Tarsal claws; (C) Hind leg; (D) Head and prothorax, ventral; (E) Meso- and metaventrite.

transverse, at least 2.5 times broader than long, widest near median part; prementum suboval, ligula sclerotized, without setae; labial palps (Fig. 61G) widely separated by distance more than width of palpiger; apical palpomere about as long and as broad as penultimate one.

Prothorax. Hypomerion simply/finely punctate. Prosternal process (Fig. 62D) with short lateral grooves. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter, its anterior margin weakly arcuate. Procoxal cavity without visible bordering line.

Pterothorax. Mesoventrite (Fig. 62D–E) with anterior edge emarginate posteriorly, anterior margin raised, interrupted in median part; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, transverse. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins narrow but entirely visible from above. Epipleuron (Fig. 62A) incomplete at apex, smooth, inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines widely separated on metaventral process (Fig. 62E), laterally complete and distinctly recurved.

Legs (Fig. 62E) short and stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron. Fore and mid trochanters roundly produced. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 62C). Tibial spurs: 1-2-2. Tarsal claws (Fig. 62B) double, swollen at base.

Abdomen. Six ventrites in both sexes. Abdominal postcoxal lines (Fig. 63A and E) recurved roundly but incomplete laterally. In male: apical margin of ventrite 5 truncate (Fig. 63A); ventrite 6 weakly emarginate (Fig. 63B); tergite VIII rounded (Fig. 63C); apodeme of sternum IX long, rod-like (Fig. 63D). Tergite X transverse (Fig. 63D). In female: apical margin of ventrite 5 emarginate (Fig. 63E); ventrite 6 (Fig. 63F) arcuate, longitudinally not divided; tergite VIII rounded at apex (Fig. 63G). Proctiger (TX) rounded, membranous at base.

Male genitalia (Fig. 63H–J). Tegminal basal piece without spines. Penis guide symmetrical, about as long as parameres, at apex entire; outer edge with small, sharp tooth near apex; inner edge without additional process. Parameres well developed, simple apically. Penis long, rod-like, curved at base, divided at apex, its basal capsule with reduced arms.

Female genitalia (Fig. 63K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, reniform; outer edge of coxite free, inner edge sinuate, ventral surface smooth. Styli absent. Bursa copulatrix without sclerite, simple, nondivided, with common oviduct originated at base. Sperm duct originated apically on bursa copulatrix.

Distribution. Asia: India.

Species included (examined). *Macrolasia arcula** Weise—monotypic genus.

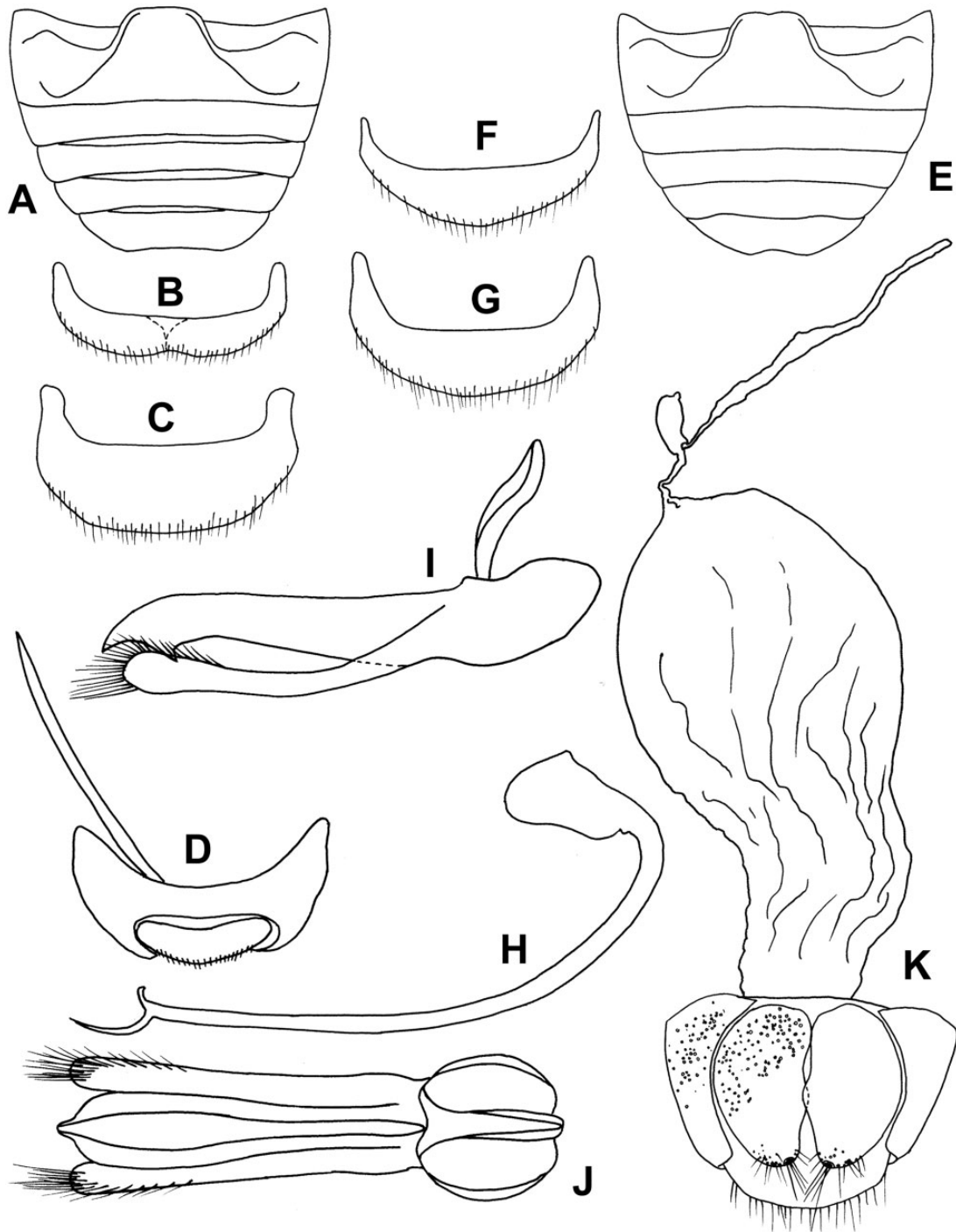


Fig. 63. *Macrolasia arcula* Weise. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal ventrite 6, female; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Subcoccinella Agassiz and Erichson 1845
(Figs. 64–66)

Lasia Hope 1840: 157 (nec Wiedemann 1824: 11; Diptera). Type species: *Coccinella globosa* Schneider 1792 (= *Coccinella vigintiquatuor punctata* Linnaeus 1758), by original designation.

Subcoccinella Agassiz and Erichson 1845: 156 (replacement name for *Lasia* Hope 1840).— Pang and Mao 1979: 160,

Jadwiszczak and Węgrzynowicz 2003: 184, Kovár 2007: 630, Ren et al. 2009: 314, Szawaryn et al. 2015: 557, 566.

Diagnosis. *Subcoccinella* is most similar to *Cynegetis* Chevrolat in having similar body size and shape, the eyes separated by more than 0.75 width of head, and prosternum in front of coxa being shorter than half length of coxal longitudinal diameter. It differs however, from *Cynegetis* by the head without ventral antennal

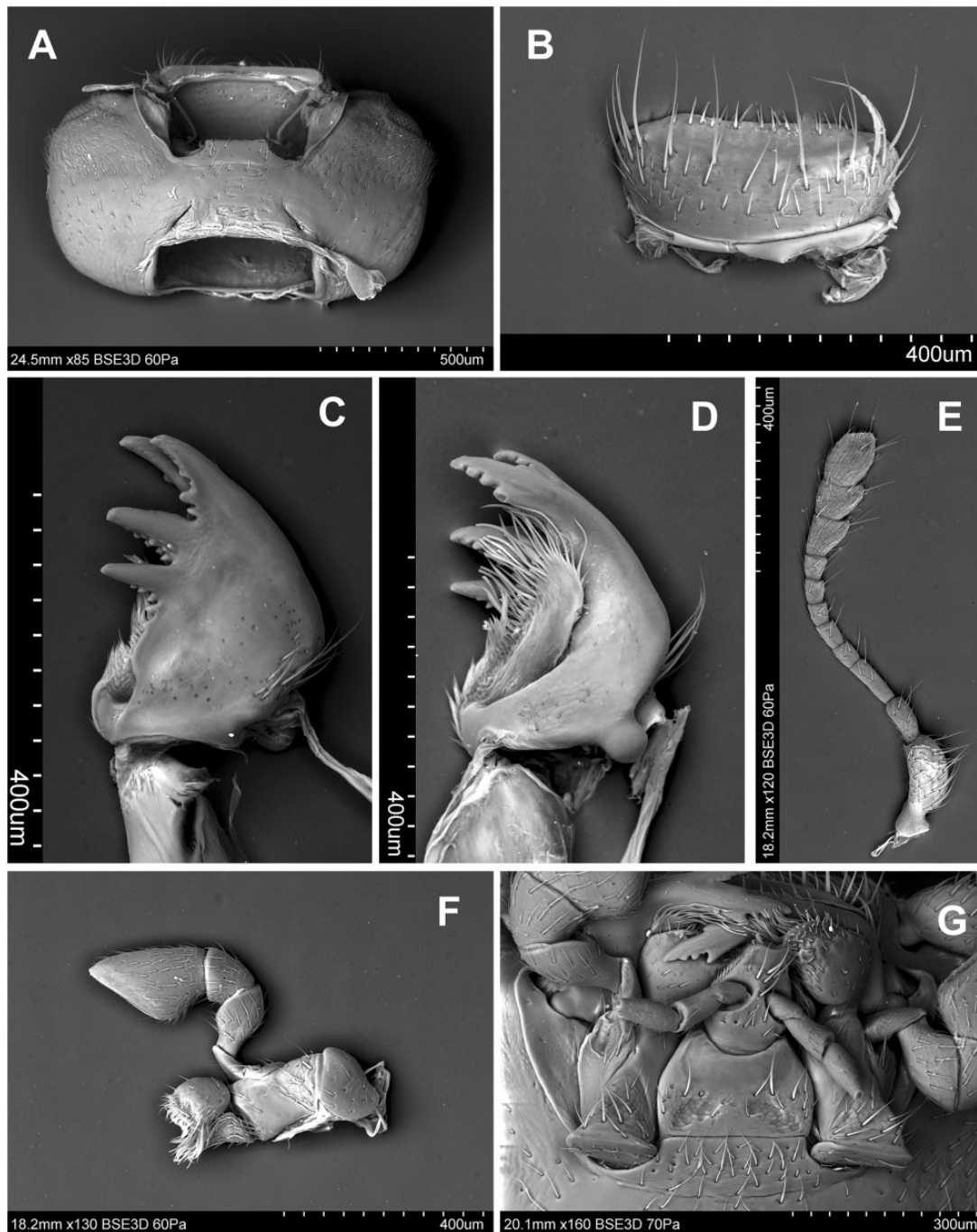


Fig. 64. *Subcoccinella vigintiquatuor punctata* (Linnaeus). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Ventral mouthparts.

grooves, the elytra with lateral margins narrow but entirely visible from above, the epipleura without foveae and the tarsal claws double only weakly swollen at their bases.

Description. Length 3.0–4.0 mm. Body (Fig. 65A) oval, convex, dorsum pubescent. Elytra orange with numerous black maculae, some of them may be joined together, sometimes maculae absent.

Head. Interocular distance more than 0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 64A) shorter than half length of gula. Antenna (Fig. 64E) composed of 11 antennomeres, length 0.5–1.0 head

width; pedicel distinctly narrower than scape; antennomere 3 elongate, three times longer than broad, antennomeres 4–8 about 1.5 longer than broad; club asymmetrical. Ventral and dorsal antennal grooves absent. Clypeus short, parallel-sided, its anterior margin straight, smooth without groove. Labrum (Fig. 64B) transverse, weakly emarginate at apex with apical part membranous. Mandible (Fig. 64C–D) multidentate apically; incisor edge multidentate, its surfaces smooth without tubercles, prosthema well developed. Maxilla (Fig. 64F) with cardo subtriangular, slightly longer than wide; stipes much longer than galea, with suture between basistipes

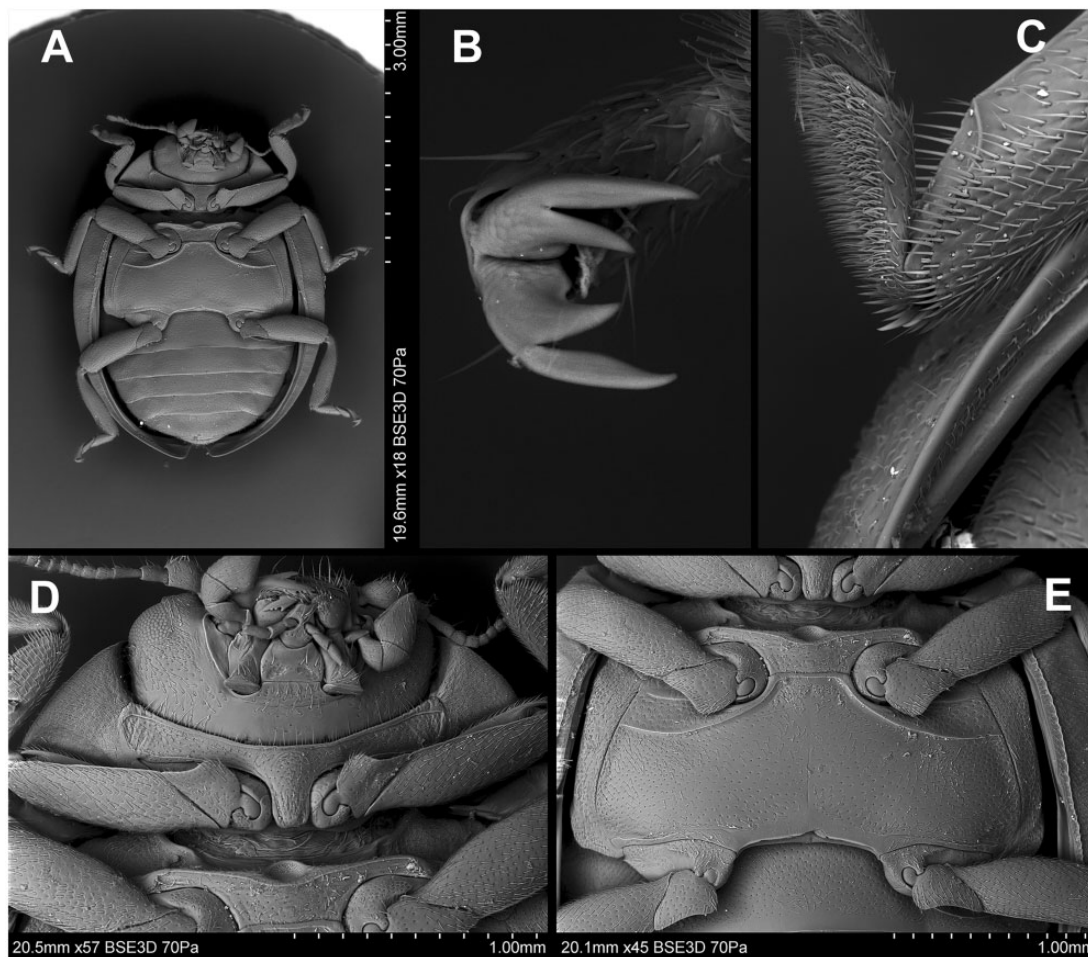


Fig. 65. *Subcoccinella vigintiquatuorpunktata* (Linnaeus). (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Head and prothorax, ventral; (E) Meso- and metathorax, ventral.

and mediostipes partly visible; lacinia simple, its mesal surface simply setose; galea oval, about as long as wide, mostly sclerotized, its ventral surface sparsely pubescent; terminal palpomere elongate, broadened apically. Submentum transverse, about 2.5 broader than long, suture weakly visible; mentum (Fig. 64G) less than two times broader than long, widest at 1/3 length basally; prementum oval, truncate apically, ligula shortly setose; labial palps (Fig. 64G) separated by distance at least equal to width of palpiger; apical palpomere at least as long and about as broad as penultimate one.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 65D) smooth, without carinae. Prosternum in front of coxa shorter than half length of coxal longitudinal diameter, anterior margin uniformly weakly arcuate. Procoxal cavity with bordering line connecting laterally with anterior prosternal bordering line.

Pterothorax. Mesoventrite (Fig. 65E) with anterior edge emarginate posteriorly, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture stright. Inner edge of metanepisternum smooth. Scutellum triangular, as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra with single size punctures; lateral margins narrow but entirely visible from above. Epipleuron (Fig. 65A) incomplete apically, smooth, its inner margin with bordering line nearly complete, undulate, fading before base of elytron.

Metaventral postcoxal lines (Fig. 65E) joined on metaventral process in straight line, laterally complete and distinctly recurved.

Legs stout with apices of mid and hind femora weakly protruding from outer margin of epipleuron (Fig. 65A). Fore and mid trochanters roundly produced with weak cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora weakly swollen, simple along inner edge; mid and hind tibiae on outer edge with oblique carina near apex (Fig. 65C). Tibial spurs: 1-2-2. Tarsal claws (Fig. 65B) double, weakly swollen at base.

Abdomen. Six ventrites in males and five ventrites in females. Abdominal postcoxal lines (Fig. 66A and E) recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 66A); ventrite 6 emarginate (Fig. 66B); tergite VIII rounded (Fig. 66C); apodeme of sternum IX moderately short and broad (Fig. 66D). Tergite X arcuate (Fig. 66D). In female: apical margin of ventrite 5 rounded (Fig. 66E); sternite VIII (Fig. 66F) rounded at apex with simple, arcuate basal margin, longitudinally at middle not divided; tergite VIII (Fig. 66G) rounded at apex. Proctiger (TX) rounded at apex.

Male genitalia (Fig. 66H-J). Tegminal basal piece without spines. Penis guide symmetrical, slightly longer than parameres, at apex entire, pointed; outer edge smooth; inner edge without additional process. Parameres broad, well developed, simple apically.

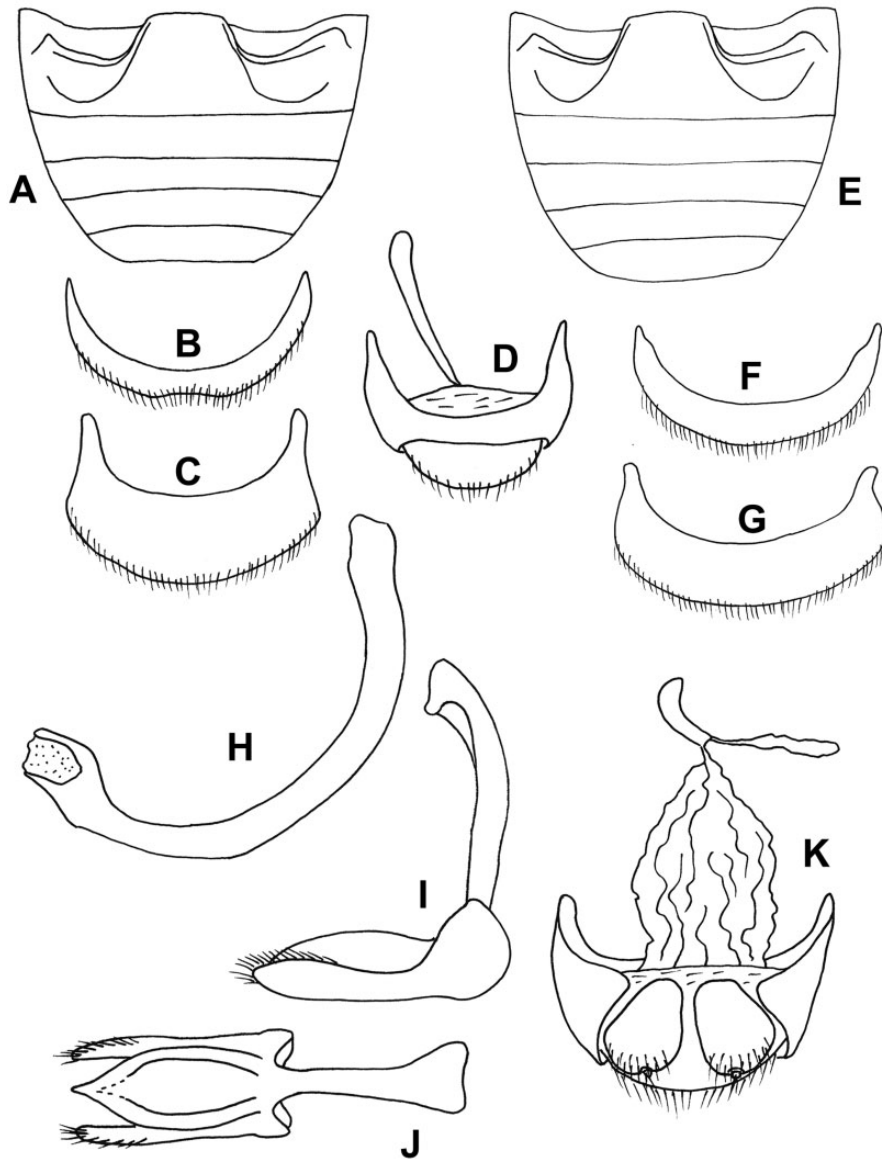


Fig. 66. *Subcoccinella vigintiquatuorpunctata* (Linnaeus). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Penis stout, curved with appendages at apex, its basal capsule with reduced arms.

Female genitalia (Fig. 66K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites distinctly less than two times longer than wide, elongate oval; outer edge of coxite free, inner edge simple—rounded, ventral surface smooth. Styli distinct. Bursa copulatrix without sclerite, simple, nondivided, with common oviduct at base. Sperm duct originated apically on bursa copulatrix.

Distribution. Palaearctic Region.

Species included (examined). *Subcoccinella vigintiquatuorpunctata** (Linnaeus).

Comment. Park and Yoon (1991) described *S. coreae* from South Korea, indicating differences in male genitalia between both species. However, comparing figures provided in their paper with studied genitalia of *S. vigintiquatuorpunctata*, we cannot ascertain

without doubts if *S. coreae* represents a valid species or it is only a population of *S. vigintiquatuorpunctata*.

Diekeana Tomaszewska and Szawaryn 2015
(Figs. 67–69 and 83C)

Diekeana Tomaszewska and Szawaryn, in Szawaryn et al. 2015: 562. Type species: *Epilachna alternans* Mulsant 1850 (by original designation).

Epilachna Chevrolat in Dejean 1837 (in part).—Szawaryn et al. 2015: 552, 562, 566.

Diagnosis. *Diekeana* is most similar and closely related to *Uniparodontata* by having the serration along inner margin of metanepisternum and the prosternal process usually with lateral carinae. *Diekeana* however differs from *Uniparodontata* by mandibular incisor edge multidentate, pronotal hypomeron simply punctate,

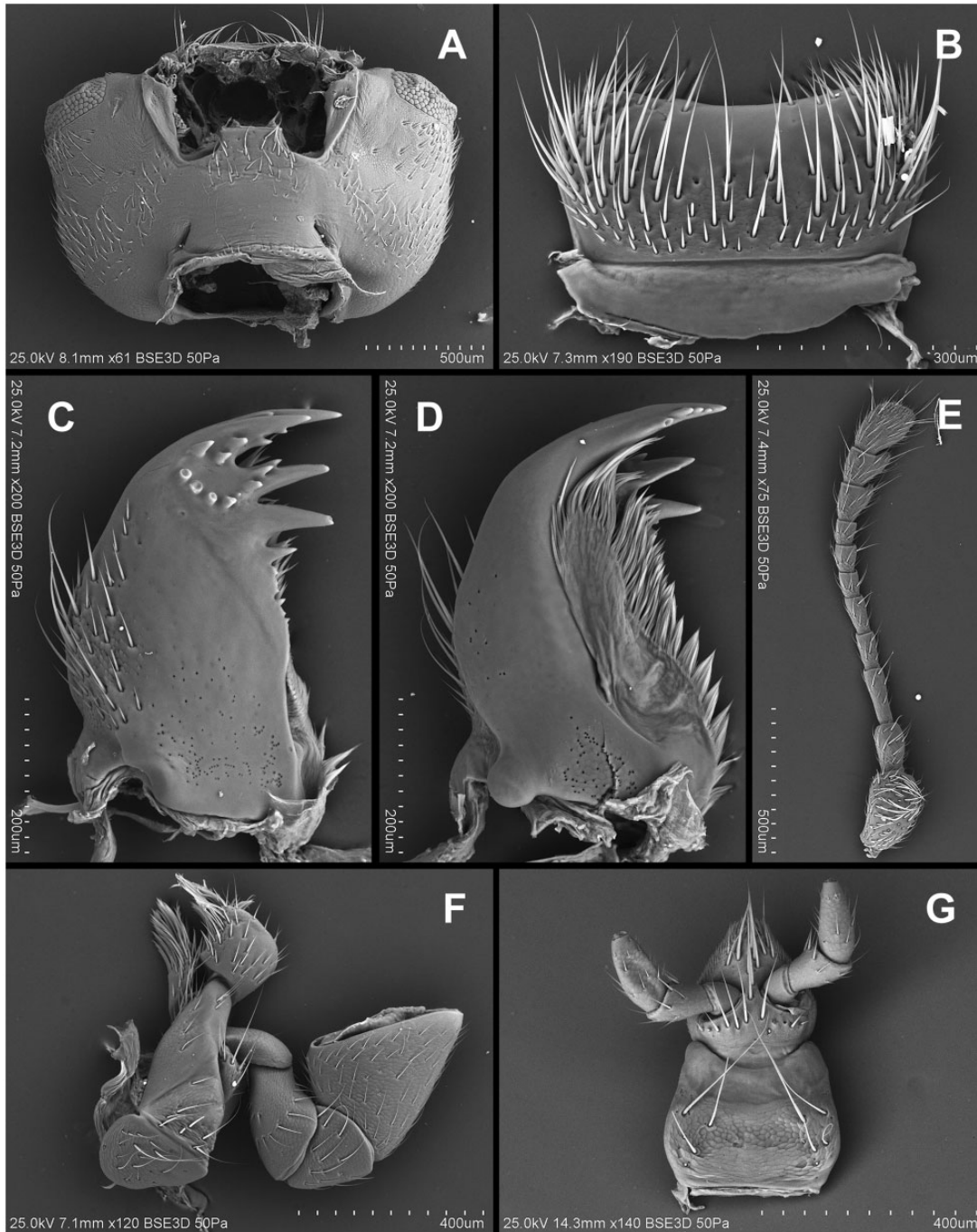


Fig. 67. *Diekeana admirabilis* (Crotch). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

metaventral postcoxal lines joined on metaventral process, mid and hind coxae simple without tubercles, tibiae without oblique carina near apex and coxites being spindle-shaped.

Description. Length 6.6–12.0 mm. Body (Fig. 68A and 83C) oval to elongate oval, convex, dorsum pubescent. Elytra orange, red or brown with black maculae or stripes.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 67A) shorter than half length of gula. Antenna (Fig. 67E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomeres 3–5 elongate,

more than two times longer than broad, antennomeres 6–8 elongate, about 1.5 times longer than broad; club asymmetrical. Ventral and dorsal antennal grooves absent (Figs. 67A and 68D). Clypeus short, parallel-sided, its anterior margin straight, smooth without groove. Labrum (Fig. 67B) transverse, anterior margin truncate or emarginate. Mandible (Fig. 67C–D) multidentate apically; incisor edge weakly rounded produced, multidentate, its surfaces smooth, prosthema well developed. Maxilla (Fig. 67F) with cardo semicircular; stipes much longer than galea, in form of single sclerite with weak trace of suture visible; lacinia simple, its mesal surface simply setose; galea oval, about as long as wide, mostly sclerotized, its ventral

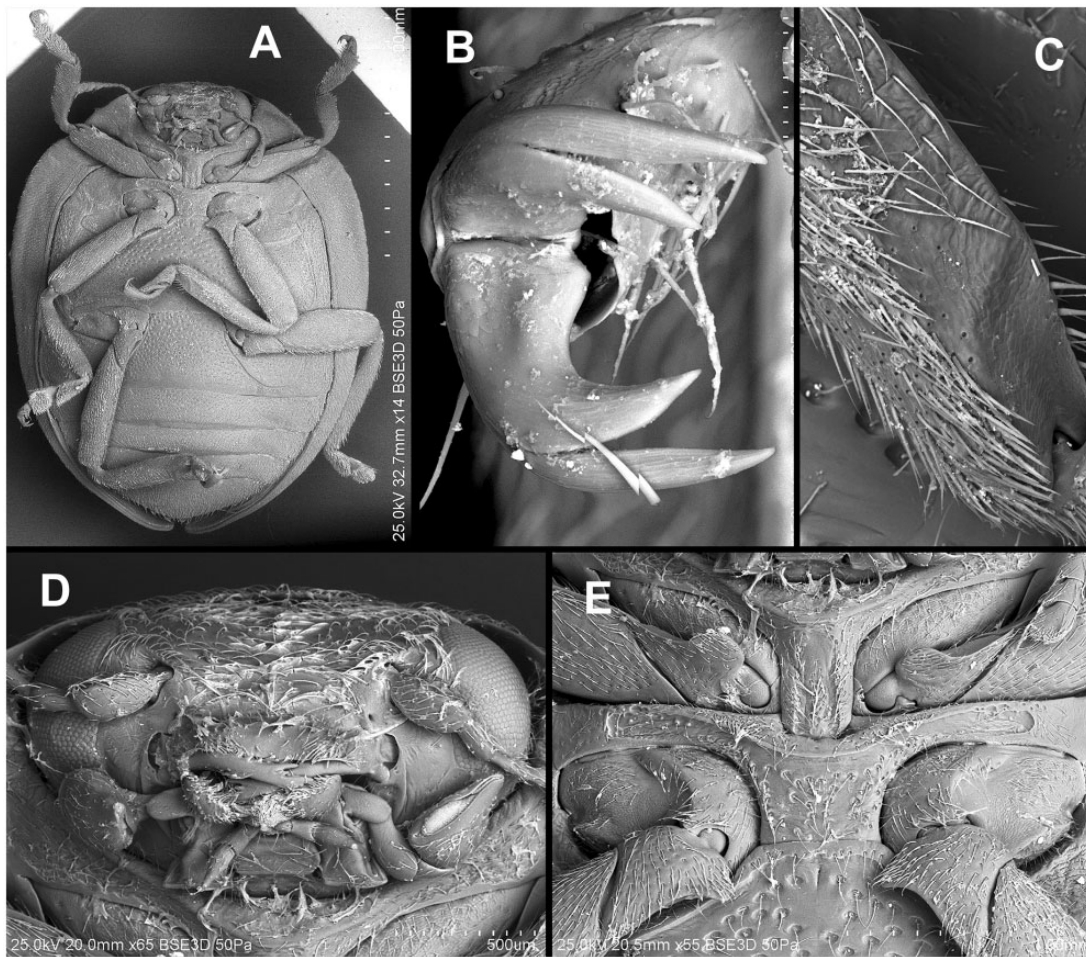


Fig. 68. *Diekeana admirabilis* (Crotch). (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Head, anterior view; (E) Prosternum, mesoventrite and base of metaventrite.

surface pubescent with long setae on apical margin; terminal palpomere elongate, broadened apically. Submentum subquadrate to weakly elongate, with suture not clearly visible; mentum (Fig. 67G) less than 2 times broader than long, widest near base; prementum oval, ligula shortly setose; labial palps (Fig. 67G) separated by distance distinctly less than width of palpiger; apical palpomere at least as long and about as broad as penultimate one.

Prothorax. Hypomeron simply/punctate. Prosternal process (Fig. 68E) smooth or with separate carinae. Prosternum in front of coxa shorter than half length of coxal longitudinal diameter, its anterior margin uniformly arcuate. Procoxal cavity without visible bordering line.

Pterothorax. Mesoventrite (Fig. 68E) with anterior edge emarginate posteriorly, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight. Metanepisternum serrate on inner edge. Scutellum triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins not or hardly visible from above. Epipleuron (Fig. 68A) incomplete apically, smooth, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines joined on metaventral process in straight line, laterally complete and distinctly recurved.

Legs slender or stout with apices of mid and hind femora weakly protruding from outer margin of elytral epipleuron (Fig. 68A). Fore

and mid trochanters simple or roundly produced with weak cavities on their inner surfaces for receiving tips of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge smooth, without carina (Fig. 68C). Tibial spurs: 1-2-2. Tarsal claws (Fig. 68B) double, weakly swollen at base.

Abdomen. Six ventrites in males and five or six ventrites in females. Abdominal postcoxal lines (Fig. 69A and E) recurved roundly, incomplete or complete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 69A); ventrite 6 emarginate (Fig. 69B); tergite VIII (Fig. 69C) rounded apically with expanded antero-lateral projections, apodeme of sternum IX long, rod-like (Fig. 69D), sometimes broadened. Tergite X rounded apically (Fig. 69D). In female: apical margin of ventrite 5 (Fig. 69E) rounded or truncate; ventrite 6 (Fig. 69F) rounded or truncate (or sternite VIII) rounded or notched in middle) with simple, arcuate basal margin, longitudinally at middle not divided; tergite VIII rounded (Fig. 69G). Proctiger (TX) truncate or broadly emarginate.

Male genitalia (Fig. 69H-J). Tegminal basal piece without spines. Penis guide symmetrical, about as long as parameres, at apex entire; outer edge smooth or at most setose; inner edge without additional process. Parameres well developed, broadened apically, with long hair in apical part. Penis long, rod like, straight or curved, its base with T-shaped capsule.

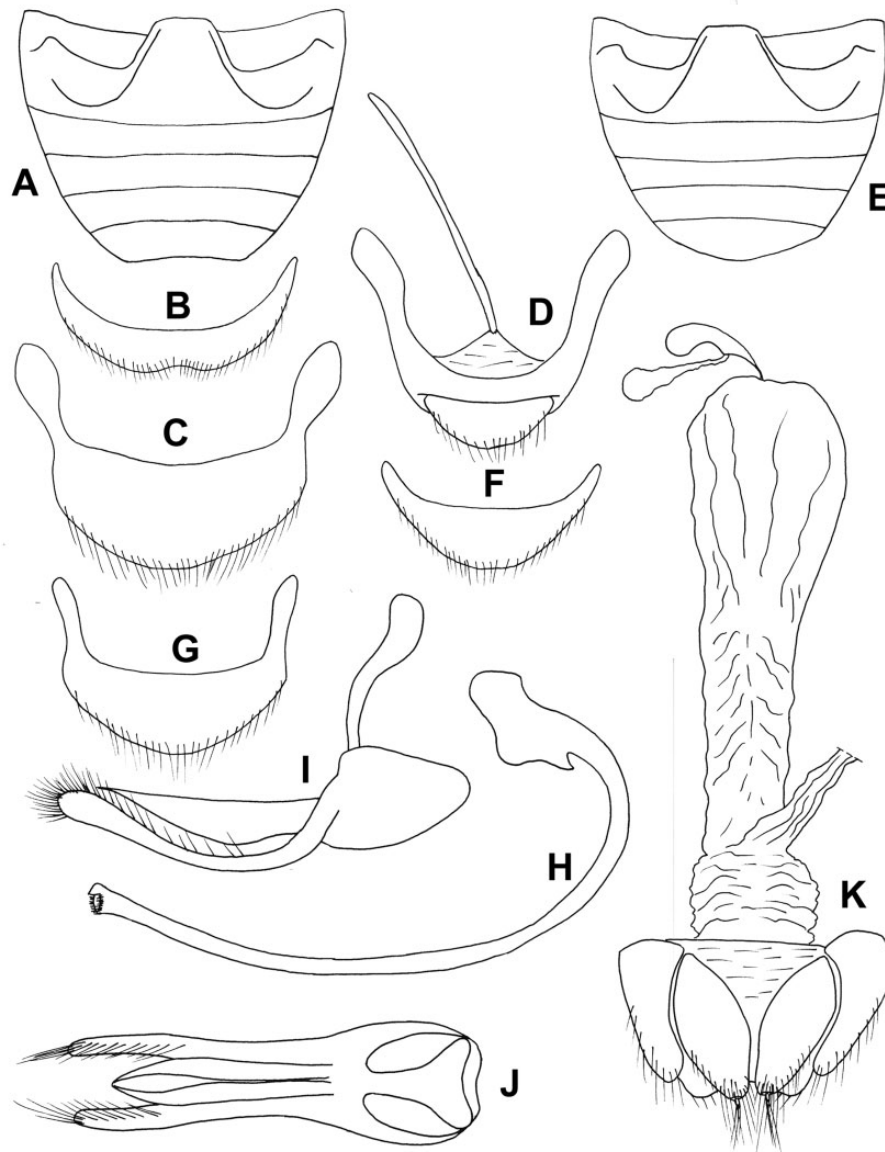


Fig. 69. *Diekeana admirabilis* (Crotch). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

Female genitalia (Fig. 69K). Sclerite anteriorly to coxites in membrane connecting paraprocts absent. Coxites much longer than wide, triangularly or regularly long-oval; outer edge of coxite free, inner edge simple—straight, rounded, or weakly emarginate, ventral surface smooth. Styli distinct. Bursa copulatrix without sclerite, large, nondivided, with common oviduct protruding at base. Sperm duct originated apically on bursa copulatrix.

Distribution. South and South-Eastern Asia.

Species included (examined). *Diekeana alternans** (Mulsant) comb. nov., *D. admirabilis* (Crotch) comb. nov., *D. glochinosa* (Pang and Mao) comb. nov., *D. hopeiana* (Miyatake) comb. nov., *D. insignis* (Gorham) comb. nov., *D. macularis* (Mulsant) comb. nov., *D. maxima* (Weise) comb. nov., *D. parainsignis* (Pang and Mao) comb. nov.

Comment. As stated in Szawaryn et al. (2015), all studied species have belonged to *Epilachna admirabilis*-group of Dieke (1947). So probably the remaining species of this group will also belong to

Diekeana as well as some other species unassigned to any group of former *Epilachna* (Szawaryn et al. 2015).

Cleta Mulsant 1850 stat. nov.
(Figs. 70–72 and 82C)

Epilachna (*Cleta*) Mulsant 1850: 866. Type species, *Epilachna eckloni* Mulsant 1850 (by subsequent designation of Jadwiszczak and Węgrzynowicz 2003).

Epilachna (*Hypsa*) Mulsant 1850: 860. Type species, *Epilachna nigrolimbata* J. Thomson 1875 (by subsequent designation of Korschefsky 1931). **Syn. nov.**

Chazeauiana Tomaszewska and Szawaryn in Szawaryn et al. 2015: 564. Type species: *Epilachna sahlbergi* Mulsant 1850 (by original designation). **Syn. nov.**

Epilachna Chevrolat in Dejean 1837 (in part).—Szawaryn et al. 2015: 554, 564, 566.

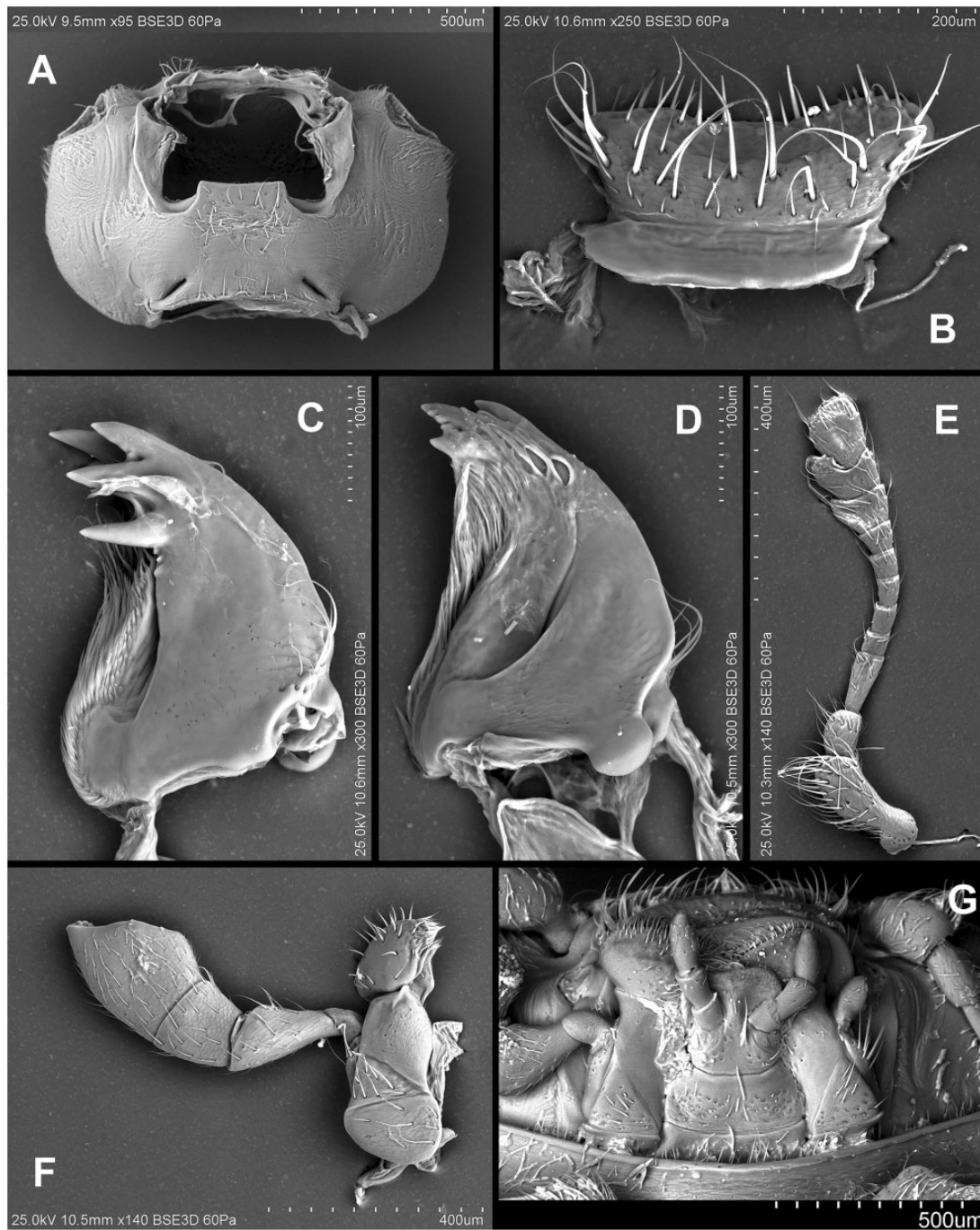


Fig. 70. (A–F) *Cleta punctipennis* Mulsant; (G) *Cleta consignata* (Weise). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

Diagnosis. Although species of *Cleta* are very diverse in shapes and color, the genus can be distinguished by the following combination of characters: mid and hind tibiae without oblique carina near their apices, apical tibial spurs absent, metaventral postcoxal lines laterally descending and complete (or sometimes continuing as lateral bordering of metaventrite) and female ventrite 6 with anterior margin roundly projected anteriorly in middle.

Description. Length 2.5–8.5 mm. Body (Fig. 71A and 82C) oval or elongate oval, convex, dorsum pubescent. Elytral coloration very

diverse, can be yellow, orange, brown or black with black, yellow, or red maculae, sometimes maculae are connected and forming circles, stripes, or other shapes.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 70A) shorter than half length of gula. Antenna (Fig. 70E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 elongate; antennomeres 4–8 subquadrate or elongate, antennomere 8 sometimes transverse; club asymmetrical. Ventral antennal grooves

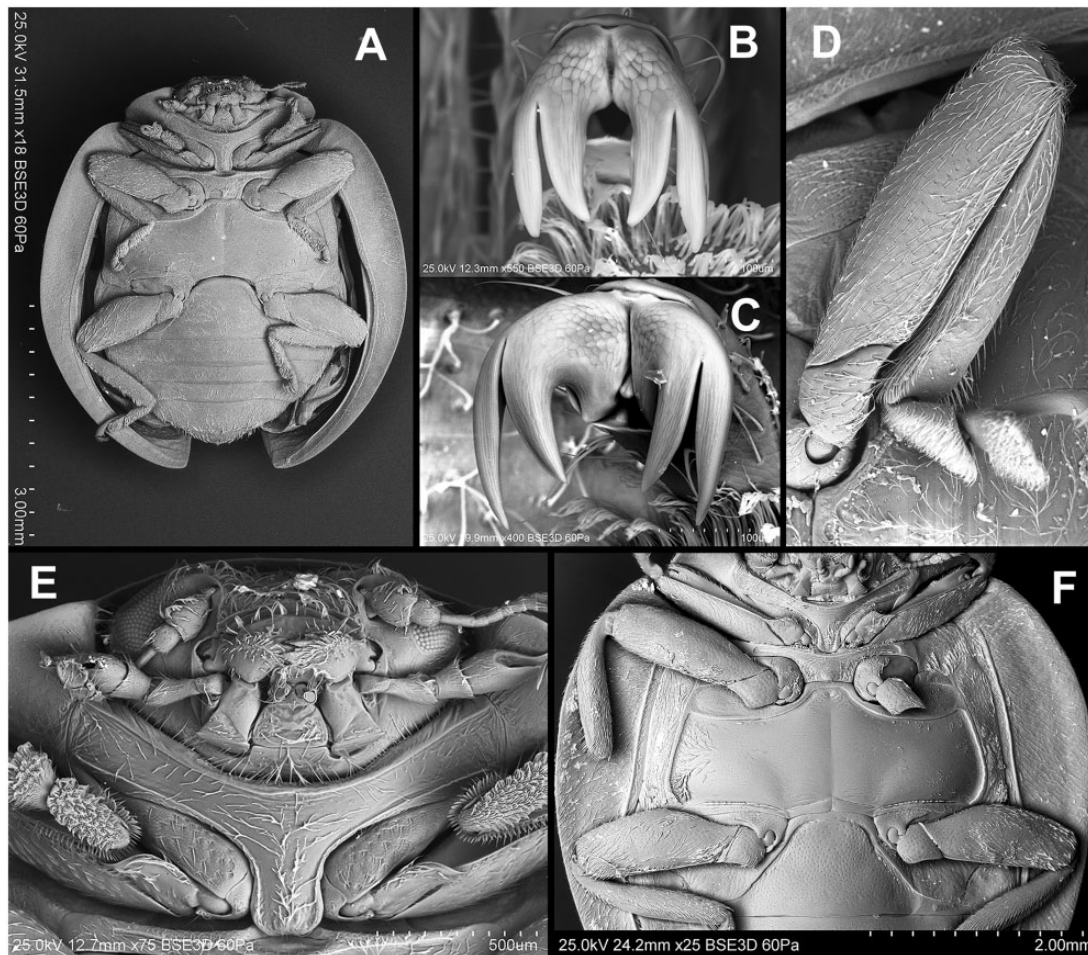


Fig. 71. (A, B, E) *Cleta punctipennis* Mulsant; (C, D) *Cleta coquereli* (Sicard); (F) *Cleta consignata* (Weise). (A) Body, ventral view; (B, C) Tarsal claws; (D) Hind tibia, apex; (E) Head and prothorax, ventral; (F) Pro-, meso-, and metathorax, ventral, and abdominal ventrite 1.

usually absent, sometimes present short, straight, extending along inner margin of eye only. Clypeus short, parallel-sided, anterior margin smooth without groove, straight or weakly emarginate. Labrum (Fig. 70B) transverse, short, with anterior margin emarginate. Mandible (Fig. 70C–D) multidentate apically; incisor edge without teeth, its surfaces smooth, prosthema well developed. Maxilla (Fig. 70F) with cardo semicircular, reaching at most slightly outside of mouth cavity; maxillary stripes much longer than galea, with suture between basistipes and mediostipes at least partly well visible; lacinia simple, its mesal surface without distinct hairs; galea transversely oval, mostly sclerotized, its ventral surface at least sparsely pubescent; terminal palpomere at least weakly elongate, parallel-sided or weakly expanded apically. Submentum transverse, suture not visible; mentum (Fig. 70G) transverse, less or more than two times broader than long, widest at base; prementum subquadrate with membranous ligula produced anteriorly, rectangular or rounded apically, with scale like appendages; labial palps (Fig. 71G) separated by distance at least equal to width of palpiger; apical palpomere usually distinctly shorter than penultimate one, distinctly narrower than penultimate, or sometimes as long and as broad as penultimate palpomere.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 71E) smooth, without carinae, bordered laterally. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal

diameter or sometimes shorter, its anterior margin uniformly arcuate or rarely triangularly produced anteriorly in median part. Procoxal cavity with bordering line, reaching laterally notosternal suture.

Pterothorax. Mesoventrite (Fig. 71F) with anterior edge straight or emarginate, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular or pentagonal, at least as long as broad or rarely transverse. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins at least narrow, entirely visible from above; epipleuron smooth, usually incomplete at apex, sometimes complete, its inner margin with bordering line nearly complete, fading before base of elytron. Metaventral postcoxal lines (Fig. 71F) joined on metaventral process in straight or weakly arcuate line, laterally complete, descending, sometimes continuing as lateral bordering of metaventrite.

Legs short, stout with apices of mid and hind femora not protruding from outer margin of elytral epipleuron (Fig. 71A). Fore and mid trochanters weakly roundly produced, with weak cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora weakly swollen, simple along inner edge; mid and hind tibiae on outer edge smooth, without carina (Fig. 71D). Tibiae without spurs. Tarsal claws double,

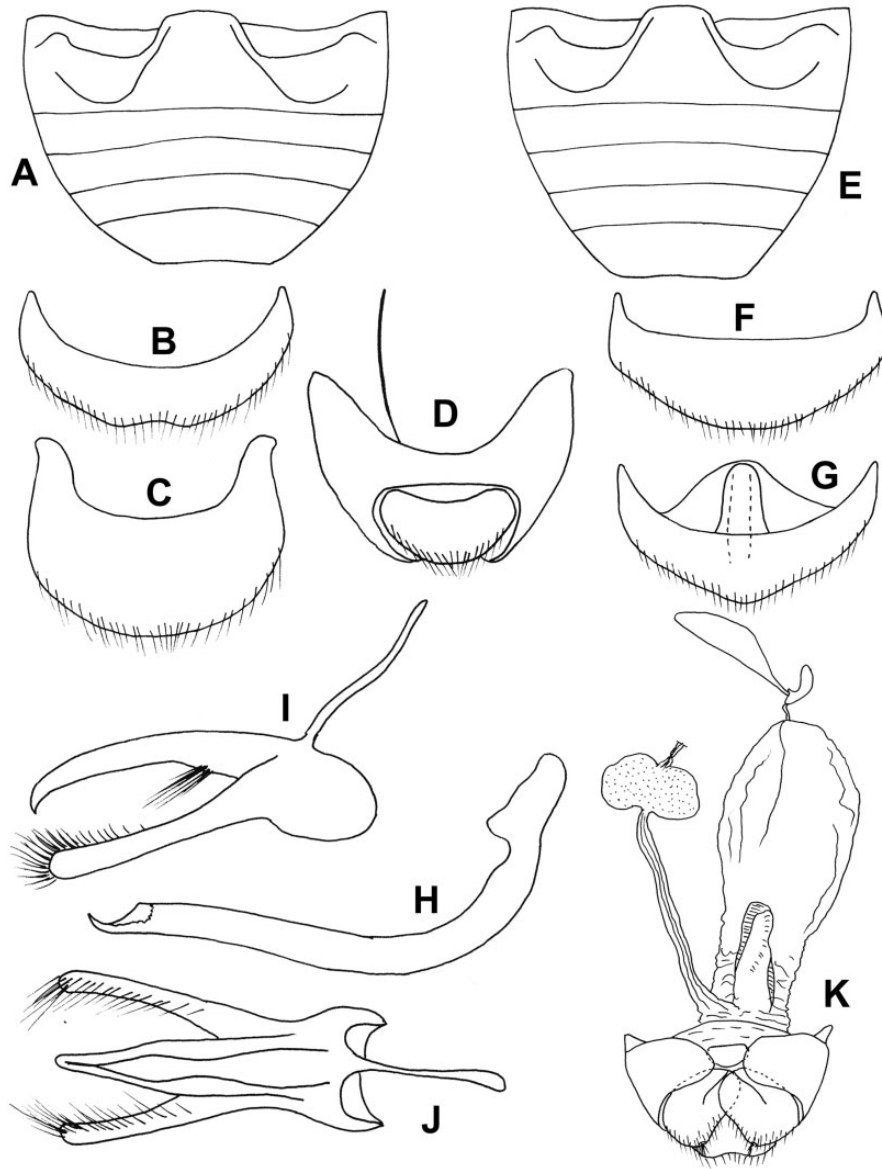


Fig. 72. *Cleta sahlbergi* Mulsant. (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal tergite VIII, female, ventral; (G) Abdominal ventrite 6, female; (H) Penis; (I) Tegmen, ventral view as placed in abdomen; (J) Tegmen, its inner view; (K) Female genitalia.

smooth or swollen at base (Fig. 71B) or double with large basal tooth (Fig. 71C).

Abdomen. Six ventrites in males and five or six ventrites in females. Abdominal postcoxal lines (Fig. 72A and E) recurved roundly, incomplete or rarely complete laterally. In male: apical margin of ventrite 5 truncate (Fig. 72A); ventrite 6 emarginate (Fig. 72B); tergite VIII (Fig. 72C) rounded or emarginate; apodeme of sternum IX simple, narrow, slender (Fig. 72D). Tergite X (Fig. 72D) subtriangular, suboval or subrectangular. In female: apical margin of ventrite 5 truncate (Fig. 72E) or rounded; ventrite 6 (sternite VIII) (Fig. 72G) rounded, truncate with median notch or emarginate, basal margin roundly projected anteriorly in middle, longitudinally at middle not divided or sometimes looking like divided but connected by membrane; tergite VIII rounded (Fig. 72F) or emarginate. Proctiger (TX) rounded, truncate or emarginate.

Male genitalia (Fig. 72H–J). Tegminal basal piece without spines. Penis guide symmetrical, narrowing anteriorly or sometimes expanded at apical part, shorter or longer than parameres, at apex entire; outer edge smooth, at most setose, bent at apical part, rarely with small, sharp tooth near apex; inner edge without additional process or with process covered with setae. Parameres well developed, simple apically, rarely with small external teeth. Penis simple or slightly curved, rod-like, sharply pointed at apex, its base with T-shaped capsule sometimes reduced.

Female genitalia (Fig. 72K). Sclerite anteriorly to coxites in membrane connecting paraprocts present (Fig. 72K) or absent. Coxites distinctly less than two times longer than wide, oval or subquadrate; inner edge of coxites simple—straight, rounded, or weakly emarginate, ventral surface with sclerotized pocket/ridge antero-medially or smooth. Styli strongly reduced and hardly visible or distinct. Bursa copulatrix sometimes with sclerite (Fig. 72K), simple,

nondivided, with common oviduct originated at base. Sperm duct originated dorsally or apically on bursa.

Distribution. Africa, Madagascar.

Species included (examined). *Cleta coquereli* (Sicard) **comb. nov.**, *C. consignata* (Weise) **comb. nov.**, *C. distincta* (Thunberg), *C. fulvohirta* (Weise) **comb. nov.**, *C. gyldenstolpei* (Weise) **comb. nov.**, *C. sahlbergi** Mulsant, *C. griveaudi* (Chazeau) **comb. nov.**, *C. vadoni* (Chazeau) **comb. nov.** *C. eckloni** Mulsant, *C. nigrolimbata* (Thomson) **comb. nov.**, *C. punctipennis* Mulsant.

Comment. Studied species of *Cleta* belong to the former *Epilachna sahlbergi* group, comprising in total approximately 106 species from Africa (Fürsch 1963, 1987). Four of the studied species (*C. distincta*, *C. eckloni*, *C. punctipennis*, *C. sahlbergi*) belonged originally to the subgenus *Cleta* of *Epilachna* Mulsant. The studied species from Madagascar belonged to *Epilachna* and *Henosepilachna* (Chazeau 1975, 1976). Probably more species of Madagascan Epilachnini may belong to this genus.

Apart from named/determined species, three unnamed species of former *Epilachna* from Africa were examined (voucher specimens

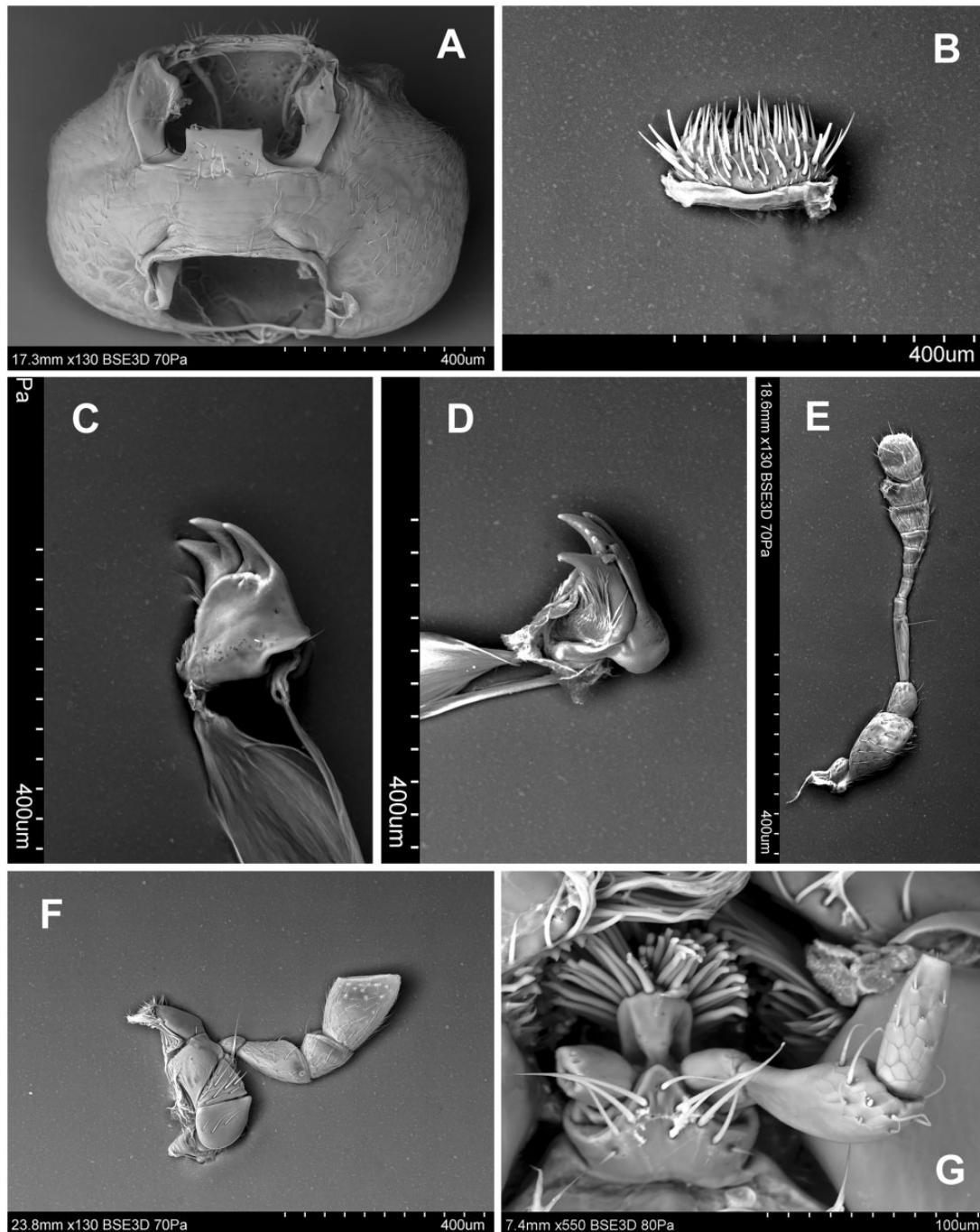


Fig. 73. (A–F) *Afidentula manderstjernaе* (Mulsant); (G) *Afidentula bisquadripunctata* (Gyllenhal). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

used in Szawaryn et al. 2015: *E.sp_KS152*, *E.sahlb.gr_KS138*, *E.sahlb.gr_KS239*).

Afidentula Kapur 1958
(Figs. 73–75 and 82B)

Afidentula Kapur 1958: 324. Type species: *Epilachna manderstjernae* Mulsant 1853 (by original designation).—Jadwiszczak and Węgrzynowicz 2003: 22, Kovár 2007: 625, Ren et al. 2009: 252, Tomaszewska and Szawaryn 2013: 27, Wang et al. 2015: 38, Szawaryn et al. 2015: 559, 565.

Afidentula Dieke 1947 (in part); Szawaryn et al. 2015: 558, 565.

Epilachna Chevrolat in Dejean (in part), 1837; Szawaryn et al. 2015: 559, 565.

Henosepilachna Li in Li and Cook 1961 (in part); Szawaryn et al. 2015: 559, 565.

Diagnosis. *Afidentula* is most similar to *Afidentula* and *Afissa* (= *Afissula* Kapur). *Afidentula* however, can be distinguished from *Afidentula* by having the mandibular incisor edge smooth, ventral surface of incisor edge without tubercles and gular sutures shorter than half length of gula. From *Afissa* it can be separated by having antennae distinctly shorter than width of the head and with at least antennomeres 7 and 8 subquadrate, labial apical

palpomere distinctly narrower than penultimate palpomere and styli absent.

Description. Length 2.7–5.4 mm. Body (Fig. 74A and 82B) round to oval, strongly convex, dorsum pubescent. Elytra light brown, brown, or sometimes black, covered with black maculae, sometimes with black lateral margins, rarely unicolor.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 73A) shorter than half length of gula. Antenna (Fig. 73E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomere 3 much elongate, about as long as three successive antennomeres combined; antennomeres 4–7 subquadrate or weakly elongate; antennomere 8 transverse; club asymmetrical. Ventral and dorsal antennal grooves absent. Clypeus short, parallel-sided, anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 73B) transverse, densely setose. Mandible (Fig. 73C–D) multidentate apically; incisor edge without teeth, its surfaces smooth without tubercles, prosthema well developed. Maxilla (Fig. 73F) with cardo semicircular; stipes much longer than galea, with suture between basistipes and mediostipes well visible; lacinia simple, small, its mesal surface simply setose; galea mostly sclerotized, transversely oval or about as long as wide, with its ventral surface glabrous or at least sparsely pubescent;

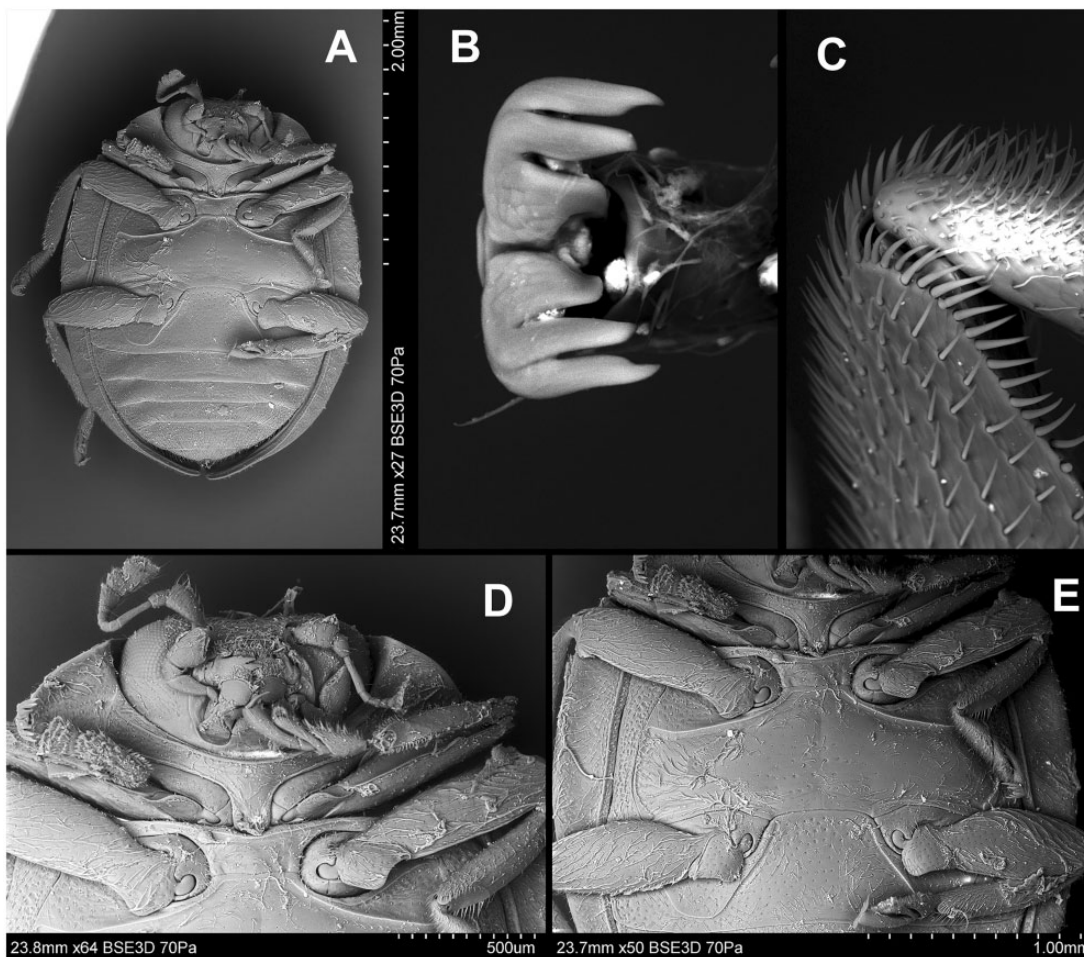


Fig. 74. *Afidentula manderstjernae* (Mulsant). (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Head, pro-, and mesothorax, ventral; (E) Pro-, meso-, and metathorax, ventral, and abdominal ventrite 1.

terminal palpomere at least weakly elongate, parallel-sided or weakly expanded apically. Submentum transverse with suture not clearly visible (Fig. 73A); mentum transverse, widest at or near base; prementum oval, ligula with medio-apical brush of setae or spines (Fig. 73G), shortly setose or without setae; labial palps (Fig. 73G) separated by distance distinctly less than width of palpi; apical palpomere distinctly shorter and narrower than penultimate one or at least as long but distinctly narrower than penultimate palpomere.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 74D) smooth, without carinae. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter or shorter than half length of coxal longitudinal diameter, its anterior margin uniformly arcuate. Procoxal cavity with bordering line, reaching laterally notosternal suture or with bordering line connected laterally with anterior prosternal bordering line.

Pterothorax. Mesoventrite (Fig. 74E) with anterior edge weakly emarginate posteriorly, anterior margin entirely raised; mesoventral process smooth or rarely tuberculate; meso-metaventral suture straight or weakly emarginate posteriorly. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins of elytra narrow but entirely visible from above. Epipleuron (Fig. 74A) incomplete apically, smooth, inner margin with bordering line nearly complete, fading before base of elytron. Metaventral post-coxal lines (Fig. 74E) joined on metaventral process in straight or weakly arcuate line, laterally complete and straight or weakly recurved, sometimes descending or descending and continuing as lateral bordering of metaventrite.

Legs short and stout with apices of mid and hind femora weakly protruding from outer margin of elytral epipleuron (Fig. 74A). Fore

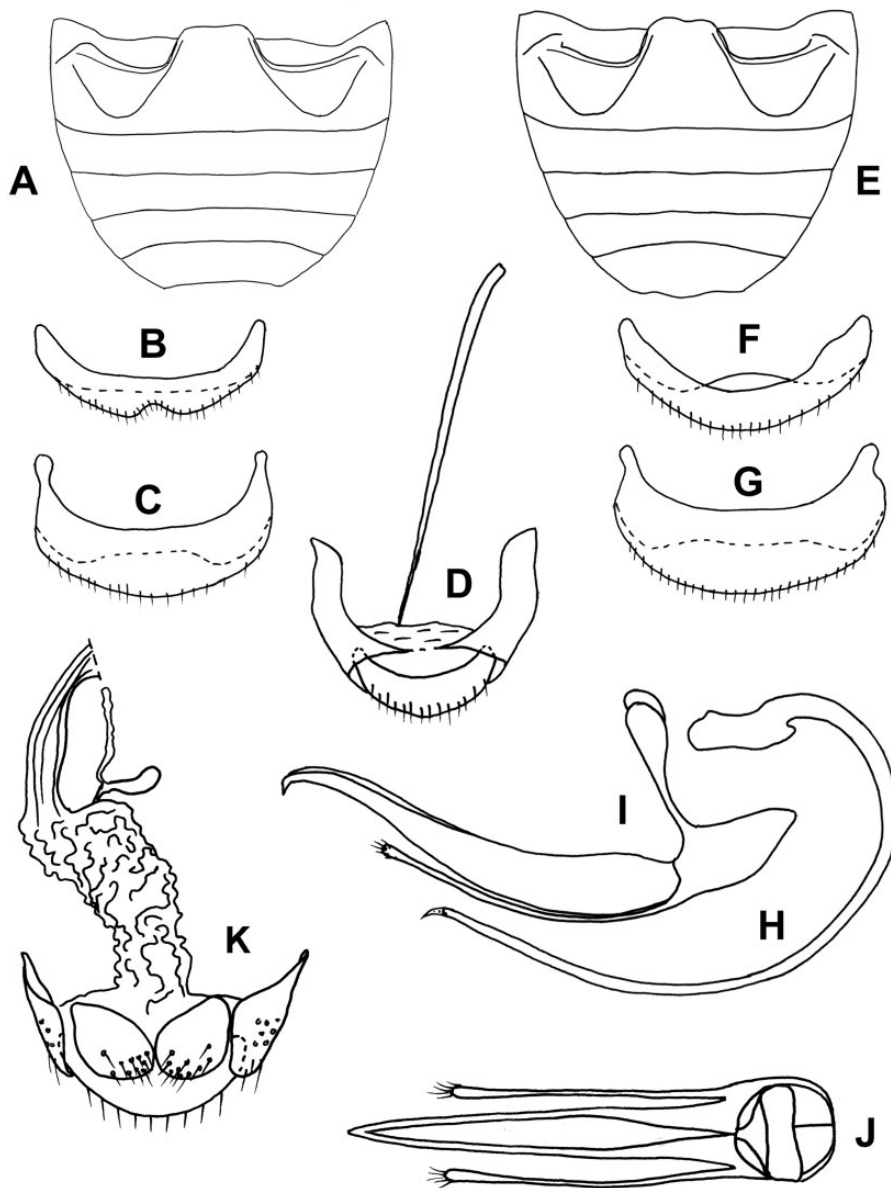


Fig. 75. *Afidentula manderstjernaе* (Mulsant). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, its inner view; (J) Tegmen, ventral view as placed in abdomen; (K) Female genitalia.

and mid trochanters angulately produced with distinct cavities on their inner surfaces for receiving tips of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge smooth, without carina, rarely with oblique carina near apex. Tibiae without distinct spurs (Fig. 74C), rarely tibial spurs 1-2-2. Tarsal claws (Fig. 74B) double with large basal tooth.

Abdomen. Six ventrites in males and five or six in females. Abdominal postcoxal lines (Fig. 75A and E) recurved roundly but incomplete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 75A); ventrite 6 weakly truncate or

emarginate (Fig. 75B); tergite VIII rounded (Fig. 75C); apodeme of sternum IX simple, rod-like (Fig. 75D). Tergite X transverse, rounded (Fig. 75D). In female: apical margin of ventrite 5 (Fig. 75E) rounded, weakly sinuate or truncate; sternite VIII (or ventrite 6) (Fig. 75F) rounded, longitudinally at middle not divided or rarely looking like divided but connected by membrane; tergite VIII rounded (Fig. 75G). Proctiger (TX) transverse, rounded, truncate, or emarginate apically.

Male genitalia (Fig. 75H-J). Tegminal basal piece without spines. Penis guide symmetrical, at apex entire; outer edge smooth; inner edge without additional process. Parameres well developed,

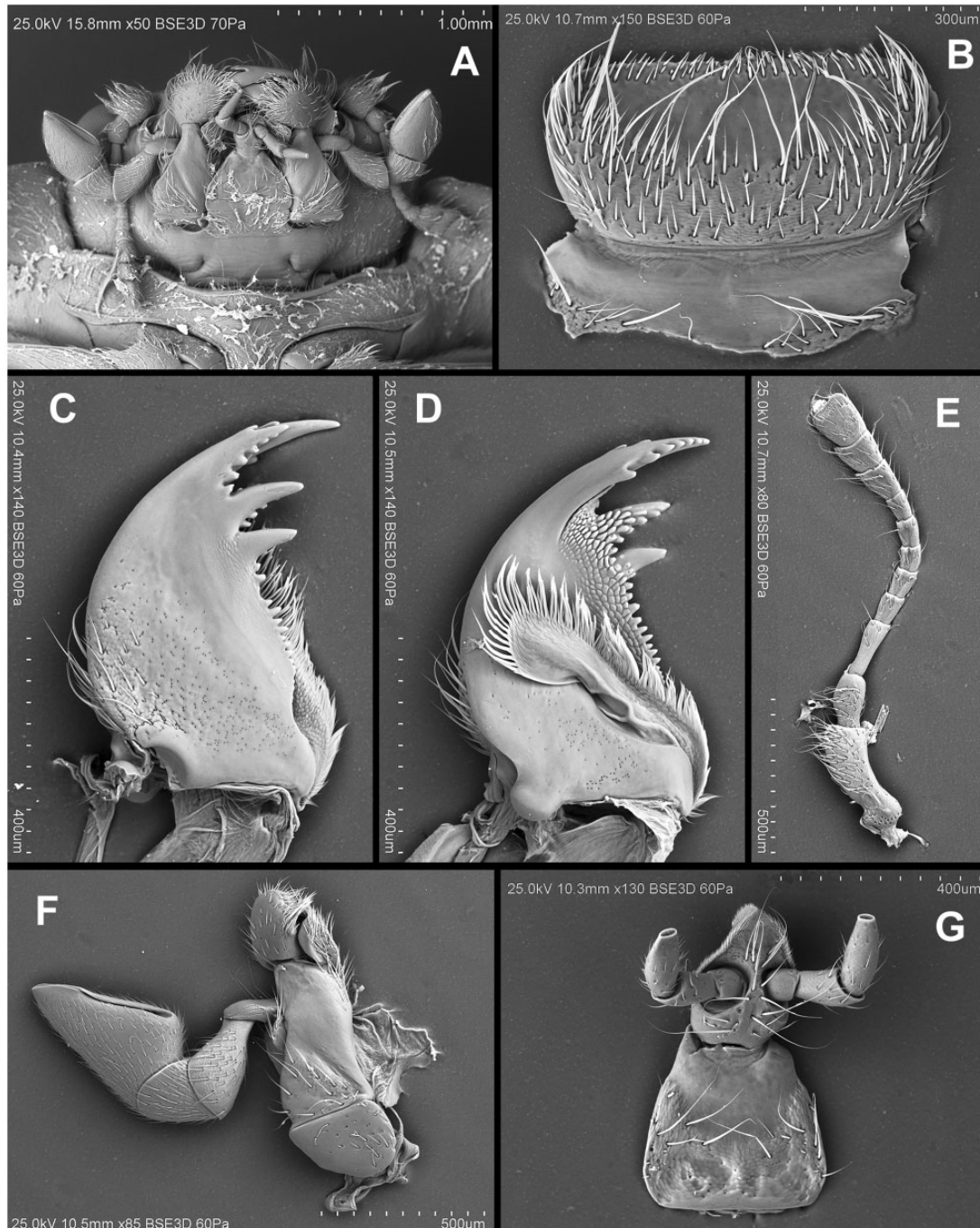


Fig. 76. *Chnootriba hova* (Weise). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Labium.

simple apically, long narrow, sometimes broadened. Penis simple, rod-like, straight or curved, simple apically or with gonopore, its base with T-shaped capsule sometimes reduced.

Female genitalia (Fig. 75K). Sclerite anteriorly to coxites in membrane connected paraprocts absent. Coxites distinctly less than two times longer than wide, oval; outer edge of coxite free, inner edge simple—rounded, ventral surface smooth. Styli absent. Bursa copulatrix without sclerite, simple, nondivided with common oviduct originated ventrally. Sperm duct originated dorsally or apically on bursa.

Distribution. South and South-Eastern Asia, Africa, Madagascar.

Species included (examined): *Afidentula acervata* (Chazeau) **comb. nov.**, *A. bisquadripunctata* (Gyllenhal), *A. blaesa* (Weise) **comb. nov.**, *A. capicola* (Mulsant) **comb. nov.**, *A. godarti* (Mulsant) **comb. nov.**, *A. himalayana* Kapur, *A. janczyki* (Fürsch) **comb. nov.**, *A. manderstjernae** (Mulsant), *A. minima* (Gorham), *A. quindecimguttata* (Dieke), *A. scitula* (Weise) **comb. nov.**, *A. semisqualens* Tomaszewska and Szawaryn, *A. stephensi* (Mulsant), *A. thanhsou-nensis* Hoang.

Comment. Originally *Afidentula* comprised only nine species from Asia (Tomaszewska and Szawaryn 2013). However, Szawaryn et al. (2015) has found that four studied African species of *Afidentula* formed a monophyletic group with *Afidentula* and probably all African species formerly classified in *Afidentula* may belong to *Afidentula*. Some

other species of former *Epilachna* and *Henosepilachna* may also belong to this genus, as *E. blaesa* and *H. acervata*.

Chnootriba Chevrolat 1837

(Figs. 76–78 and 83B)

Chnootriba Chevrolat in Dejean 1837: 460. Type species: *Coccinella similis* Thunberg 1781 (by monotypy).—Jadwiszczak and Węgrzynowicz 2003: 28, Szawaryn et al. 2015: 554, 560, 565.

Henosepilachna (Elateria) Fürsch 1964: 182. Type species: *Coccinella elaterii* Rossi 1794 (by original designation). Synonymized with *Henosepilachna* Li 1961 by Jadwiszczak and Węgrzynowicz 2003: 132. **Syn. nov.**

Epilachna Chevrolat in Dejean 1837 (in part). Szawaryn et al. 2015: 560, 565.

Henosepilachna Li in Li and Cook 1961 (in part). Szawaryn et al. 2015: 554, 560, 565.

Diagnosis. *Chnootriba* is one of the most morphologically diverse genera of Epilachnini. The following combination of characters can separate species of *Chnootriba* from species of other African Epilachnini genera: mid and hind tibiae without oblique carina near apex, tarsi double with large basal tooth or distinct

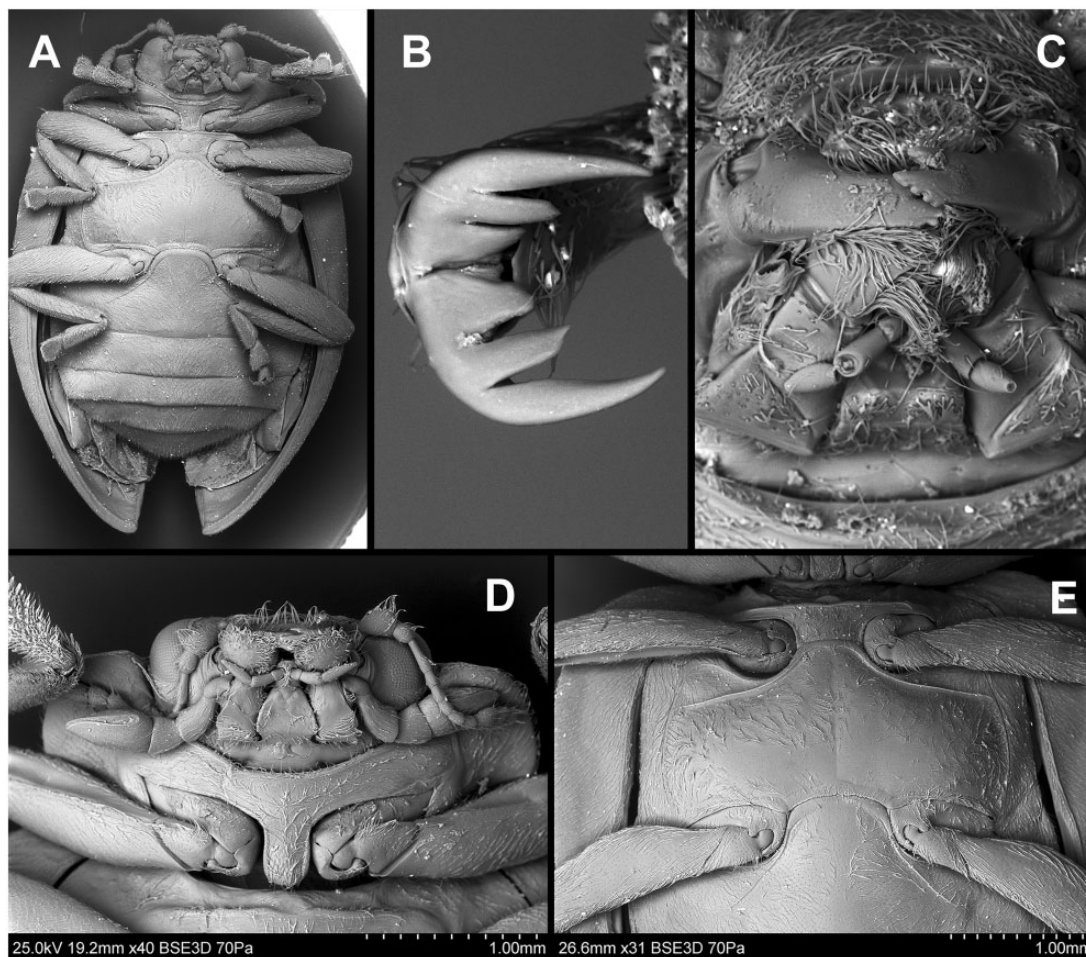


Fig. 77. (A–C) *Chnootriba similis* (Thunberg); (D–E). *Chnootriba erichi* (Weise). (A) Body, ventral view; (B) Tarsal claws; (C) Ventral mouthparts; (D) Head and prothorax, ventral; (E) Meso- and metathorax, ventral, and abdominal ventrite 1.

angulation, prementum oval with ligula simple, not produced anteriorly, apical labial palpomere as broad as penultimate one, female ventrite 6 (sternite VIII) fully divided or appears like divided medially but connected by membrane, with basal/anterior margin simply arcuate (Fig. 78F).

Description. Length 6.0–10.1 mm. Body (Fig. 77A and 83B) oval to elongate oval, convex, dorsum pubescent. Elytral coloration very diverse, with ground color yellow, orange, red, brown to black with diverse patterns made by maculae or stripes.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular sutures (Fig. 76A) about half length of gula. Antenna (Fig. 76E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel about as broad as scape; antennomeres 4–8 elongate, subquadrate, rarely transverse; club asymmetrical. Ventral antennal grooves absent or short, straight, along inner margin of eye only. Dorsal antennal grooves absent. Clypeus parallel-sided, its anterior margin straight or weakly emarginate, smooth without groove. Labrum (Fig. 76B) transverse, truncate or emarginate at apex. Mandible (Figs. 76C–D and 77C) multidentate apically; incisor edge without teeth or multidentate, its surfaces smooth or densely tuberculate,

prostheca well developed. Maxilla (Fig. 76F) with cardo quadrate to weakly transverse reaching at most slightly outside of mouth cavity; stipes much longer than galea, with suture between basistipes and mediostipes at least partly well visible; lacinia simple, its mesal surface simply setose; galea as long as wide or weakly elongate, mostly transversely oval, its ventral surface pubescent or glabrous; terminal palpomere at least weakly elongate, parallel-sided or weakly expanded apically or elongate and broadened apically, sometimes distinctly securiform. Submentum usually short transverse, sometimes longer than broad, suture weakly visible; mentum (Fig. 76G) transverse, widest at or near base or sides subparallel; prementum oval, ligula covered with long setae or shortly setose, rarely without setae; labial palps (Fig. 76G) separated by distance distinctly less than width of palpiger or at least equal to width of palpiger; apical palpomere as long or longer and about as broad as penultimate one.

Prothorax. Hypomerion simply/finely punctate. Prosternal process (Fig. 77D) with surface smooth, without carinae, with lateral bordering, sometimes with lateral depressions. Prosternum in front of coxa 0.5–1.0 length of coxal longitudinal diameter or shorter than half

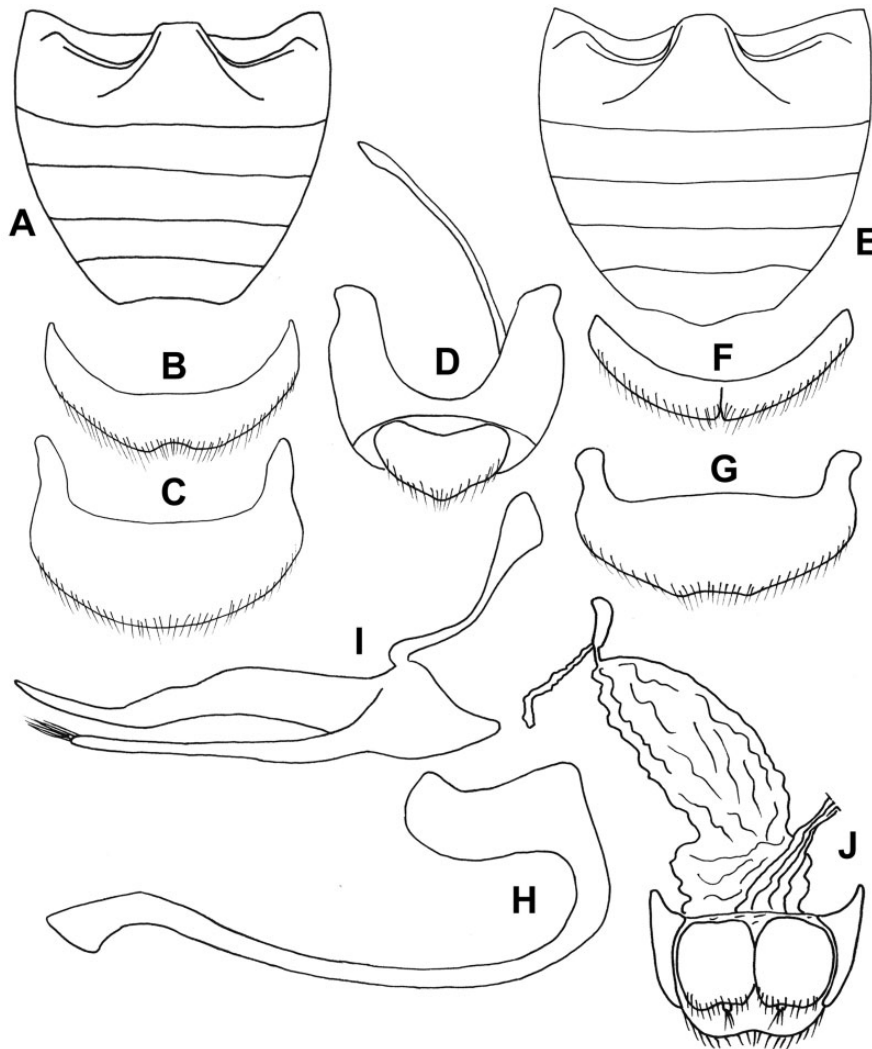


Fig. 78. *Chnootriba similis* (Thunberg). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal sternite VIII, female, ventral; (G) Abdominal tergite VIII, female, ventral; (H) Tegmen, ventral view as placed in abdomen; (I) Penis; (J) Female genitalia.

length of coxal longitudinal diameter, anterior margin uniformly weakly arcuate. Procoxal cavity with bordering line, reaching laterally notosternal suture or sometimes without visible bordering line. Anterior margin of prosternum often with bordering.

Pterothorax. Mesoventrite (Fig. 77E) with anterior edge emarginate posteriorly, anterior margin entirely raised, sometimes without border in mid part; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite with tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins narrow or moderately wide,

entirely visible from above, sometimes distinctly explanate in basal half. Epipleuron (Fig. 77A) incomplete apically, smooth, sometimes with foveae for receiving tips of femora, inner margin with bordering line nearly complete, fading before base of elytron or rarely with bordering line extending at most to level of mid coxa. Metaventral postcoxal lines (Fig. 77E) joined on metaventral process in straight or weakly arcuate line or rarely separated on metaventral process; laterally complete or rarely incomplete, recurved, straight, or descending.

Legs slender, rarely more stout with apices of mid and hind femora protruding from outer margin of epipleuron (Fig. 77A), rarely

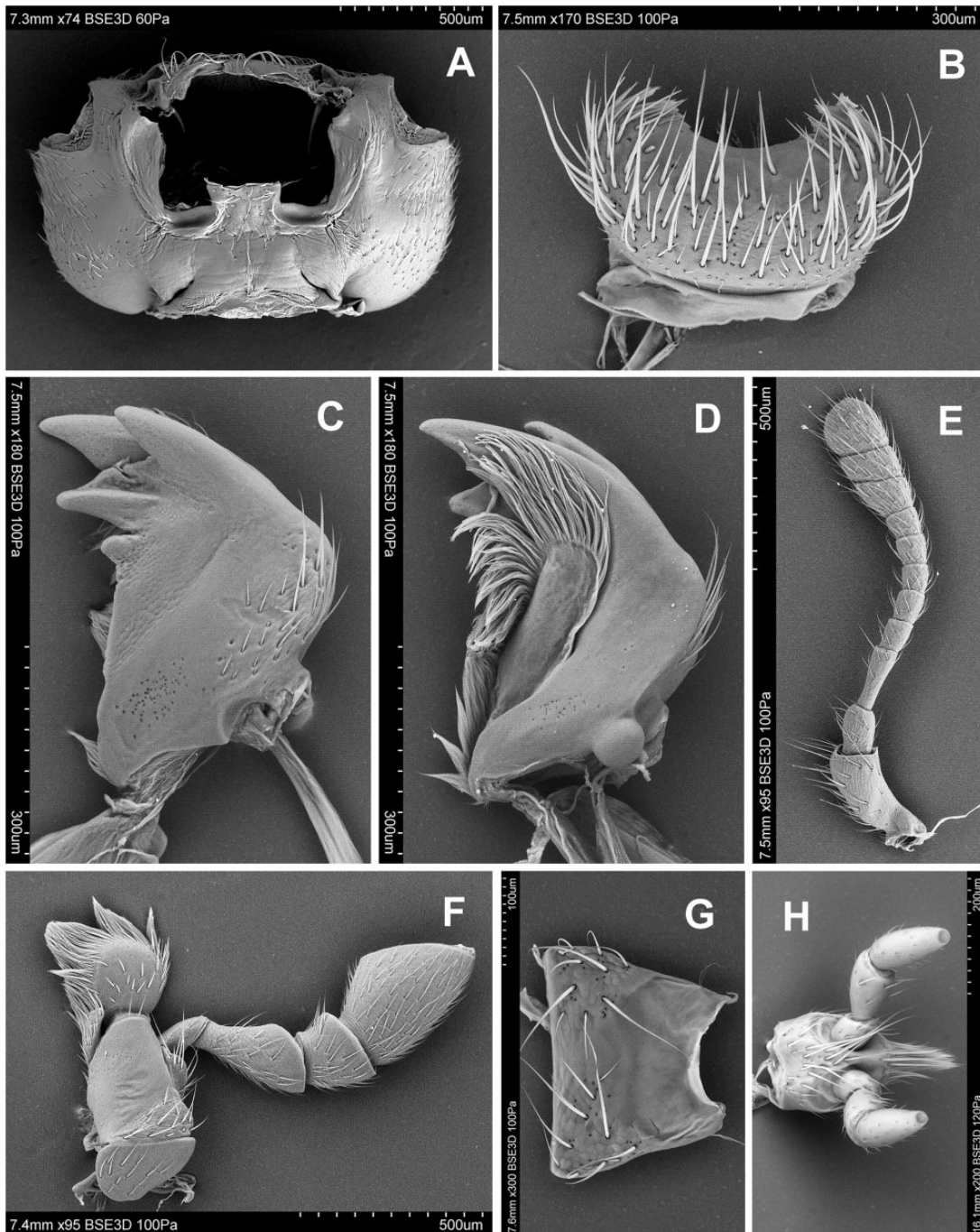


Fig. 79. *Papuaepilachna kapuri* (Bielawski). (A) Head, ventral view; (B) Labrum; (C) Mandible, dorsal view; (D) Mandible, ventral view; (E) Antenna; (F) Maxilla; (G) Mentum; (H) Prementum and labial palps.

when elytra laterally explanate not protruding from outer margin of epipleuron. Fore and mid trochanters simple or roundly or angulately produced, with weak cavities on their inner surfaces for receiving tips of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind tibiae on outer edge smooth, without carina. Tibial spurs: 1-2-2 or rarely 2-2-2, sometimes tibial spurs absent. Tarsal claws double with large basal tooth (Fig. 77B) or double with basal angulation.

Abdomen. Six ventrites in males and six or five ventrites in females. Abdominal postcoxal lines (Fig. 78A and E) recurved roundly, incomplete or complete laterally, without additional line, sometimes abdominal postcoxal lines reduced. In male: apical margin of ventrite 5 truncate (Fig. 78A); ventrite 6 emarginate (Fig. 78B); tergite VIII distinctly excised medially at apex or rounded (Fig. 78C); apodeme of sternum IX thin, rod-like (Fig. 78D). Tergite X arcuate (Fig. 78D) or truncate at apex. In female: apical margin of ventrite 5 rounded, sometimes triangularly produced posteriorly at middle (Fig. 78E); ventrite 6 (sternite VIII) (Fig. 78F) longitudinally at middle looking like divided but connected by membrane or fully or almost divided along middle, with simple arcuate basal margin; tergite VIII (Fig. 78G) truncate or emarginate apically or distinctly excised medially at apex, sometimes rounded. Proctiger (TX) emarginate (Fig. 78J) or rounded at apex.

Male genitalia (Fig. 78H and I). Tegminal basal piece without spines. Penis guide symmetrical, as long or longer than parameres, at apex entire; outer edge smooth or at most setose, sometimes with small, sharp tooth near apex; inner edge without additional process. Parameres well developed, simple apically or sometimes with small external teeth. Penis long, thin, with curved apex, sometimes with apex broadened or pointed with gonopore and appendages, base with T-shaped capsule reduced.

Female genitalia (Fig. 78J). Sclerite anteriorly to coxites in membrane connecting paraprocts absent or present. Coxites distinctly less than two times longer than wide, elongate oval or pentagonal; outer edge of coxite free, inner edge with small excision medio-basally or simple—straight, rounded, or weakly emarginate, ventral surface of coxite with sclerotized pocket antero-medially or smooth. Styli distinct or sometimes strongly reduced and hardly visible. Bursa copulatrix without sclerite, simple, nondivided, with common oviduct originated at base. Sperm duct simple, its base originated apically or dorsally on bursa copulatrix.

Distribution. Africa, Madagascar, Middle East, South Europe.

Species included (examined): *Chnootriba annulata* (Kolbe) **comb. nov.**, *Ch. bigemmata* (Fürsch) **comb. nov.**, *Ch. biplagiata* (Kolbe) **comb. nov.**, *Ch. cinerascens* (Weise) **comb. nov.**, *Ch. connectens* (Weise) **comb. nov.**, *Ch. elaterii* (Rossi) **comb. nov.**, *Ch.*

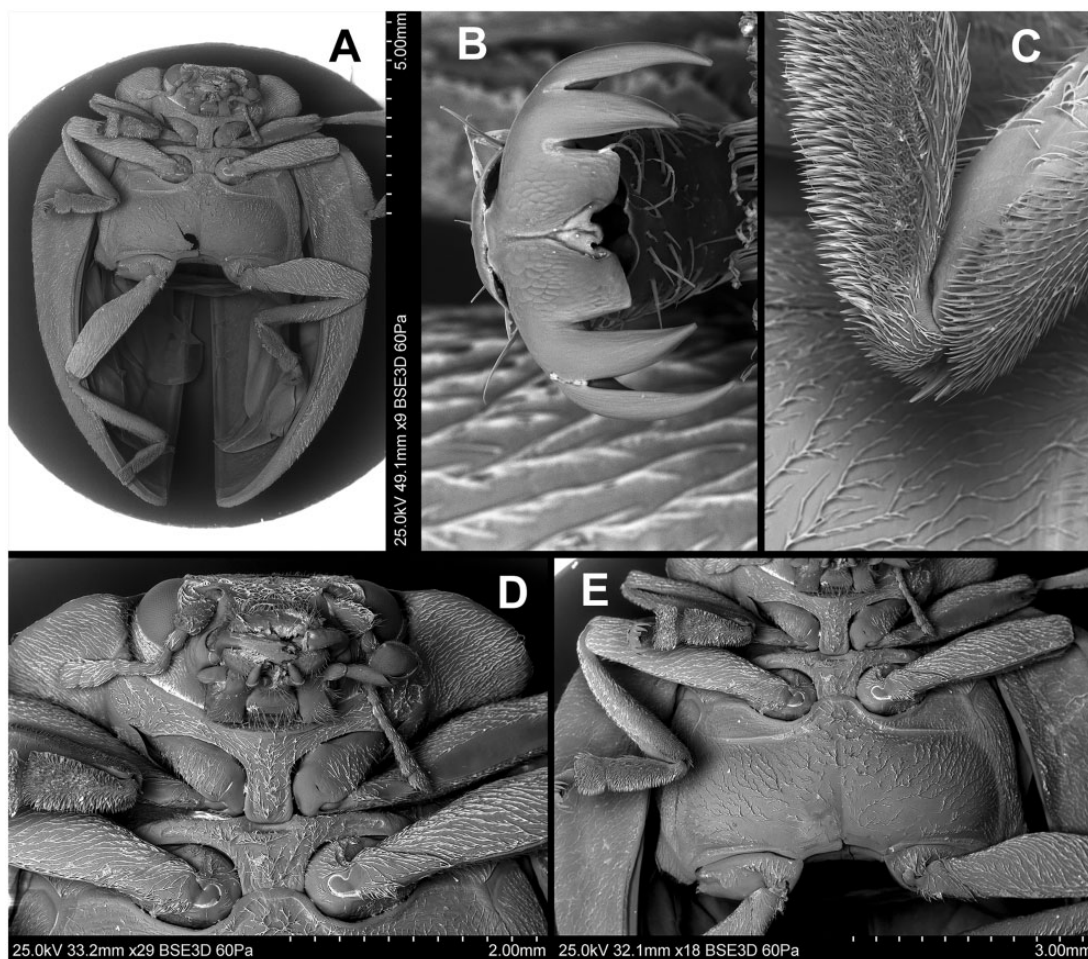


Fig. 80. *Papuaepilachna orrori* (Bielawski). (A) Body, ventral view; (B) Tarsal claws; (C) Mid tibia, apex; (D) Head, pro-, and mesothorax, ventral; (E) Pro-, meso-, and metathorax, ventral.

erectepubescens Mader, *Ch. erichi* (Weise) **comb. nov.**, *Ch. guttifera* (Weise) **comb. nov.**, *Ch. hirta* (Thunberg) **comb. nov.**, *Ch. hova* (Weise) **comb. nov.**, *Ch. kaffaensis* (Weise) **comb. nov.**, *Ch. maderi* (Fursch), *Ch. ocellata* (Bertoloni) **comb. nov.**, *Ch. pauli* (Weise) **comb. nov.**, *Ch. pavonia* (Olivier) **comb. nov.**, *Ch. similis** (Thunberg), *Ch. tetracycla* (Gerstaecker) **comb. nov.**, *Ch. umbratilis* (Weise) **comb. nov.**, *Ch. vulgaris* (Weise) **comb. nov.**

Comment. Studied species belonged mainly to the *elaterii*-group of Fürsch (1964), *hirta*-group, *tertacycla*-group and *pauli*-group (Fürsch 1991) of former *Henosepilachna*. It is probable that all remaining species from these groups will belong to *Chnootriba*. Further research could also result in moving some species of former *Epilachna* from Madagascar to the genus *Chnootriba*.

Apart from the named/determined species, an unnamed species of former *Henosepilachna* was examined (voucher specimen used in Szawaryn et al. 2015: KS111_H_sp.

Papuaepilachna Szawaryn and Tomaszewska 2013 (Figs. 79–81 and 83H)

Papuaepilachna Szawaryn and Tomaszewska 2013: 2435. Type species: *Afidentula nasti* Bielawski 1963 (by original designation).—Szawaryn et al. 2015: 554, 560, 565.

Lalokia Szawaryn and Tomaszewska 2013: 2429 [nec *Lalokia* Hardy 1987]. Type species: *Epilachna aruensis* Crotch 1874 (by original designation). Synonymized by Szawaryn et al. 2015: 565.

Henosepilachna Li in Li and Cook 1961 (in part);—Szawaryn et al. 2015: 554, 560, 565.

Diagnosis. *Papuaepilachna* is most similar and closely related to *Henosepilachna*. It however, can be distinguished from *Henosepilachna* by having female ventrite 6 not divided longitudinally

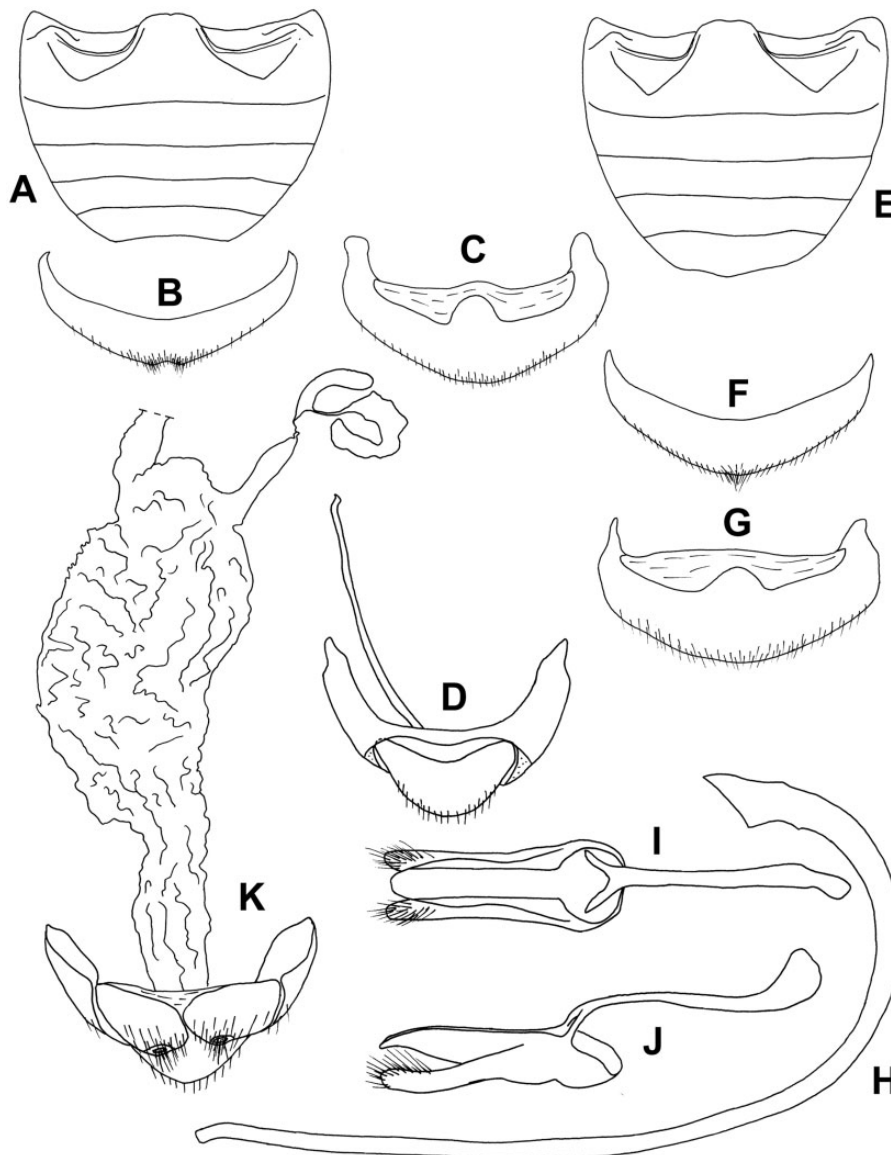


Fig. 81. *Papuaepilachna kapuri* (Bielawski). (A) Abdomen, male, ventral; (B) Abdominal ventrite 6, male; (C) Abdominal tergite VIII, male, ventral; (D) Male genital segment; (E) Abdomen, female, ventral; (F) Abdominal ventrite 6, female; (G) Abdominal tergite VIII, female, ventral; (H) Penis; (I) Tegmen, its inner view; (J) Tegmen, ventral view as placed in abdomen; (K) Female genitalia.

at middle, metaventral postcoxal lines joined on metaventral process in straight line and tegminal basal piece without a pair of spines on inner margin near base of tegminal strut.

Description. Length 5.8–9.3 mm. Body (Fig. 80A and 83H) oval, strongly convex, dorsum pubescent. Elytra black, sometimes with red maculae or with yellow-orange spots, rarely elytra yellow-orange with black maculae.

Head. Interocular distance 0.50–0.75 head width. Inner orbits emarginate antero-medially, closest posteriorly. Frons simple. Gular

sutures (Fig. 79A) at least as long as half length of gula. Antenna (Fig. 79E) composed of 11 antennomeres, length 0.5–1.0 head width; pedicel distinctly narrower than scape; antennomeres 3–8 transverse, quadrate or weakly elongate; club asymmetrical. Ventral and dorsal antennal grooves absent. Clypeus parallel-sided, its anterior margin straight or weakly arcuate posteriorly, without groove. Labrum (Fig. 79B) transverse with apical margin emarginate medially. Mandible (Fig. 79C–D) multidentate apically; incisor edge multidentate or without teeth, its surfaces smooth or provided with

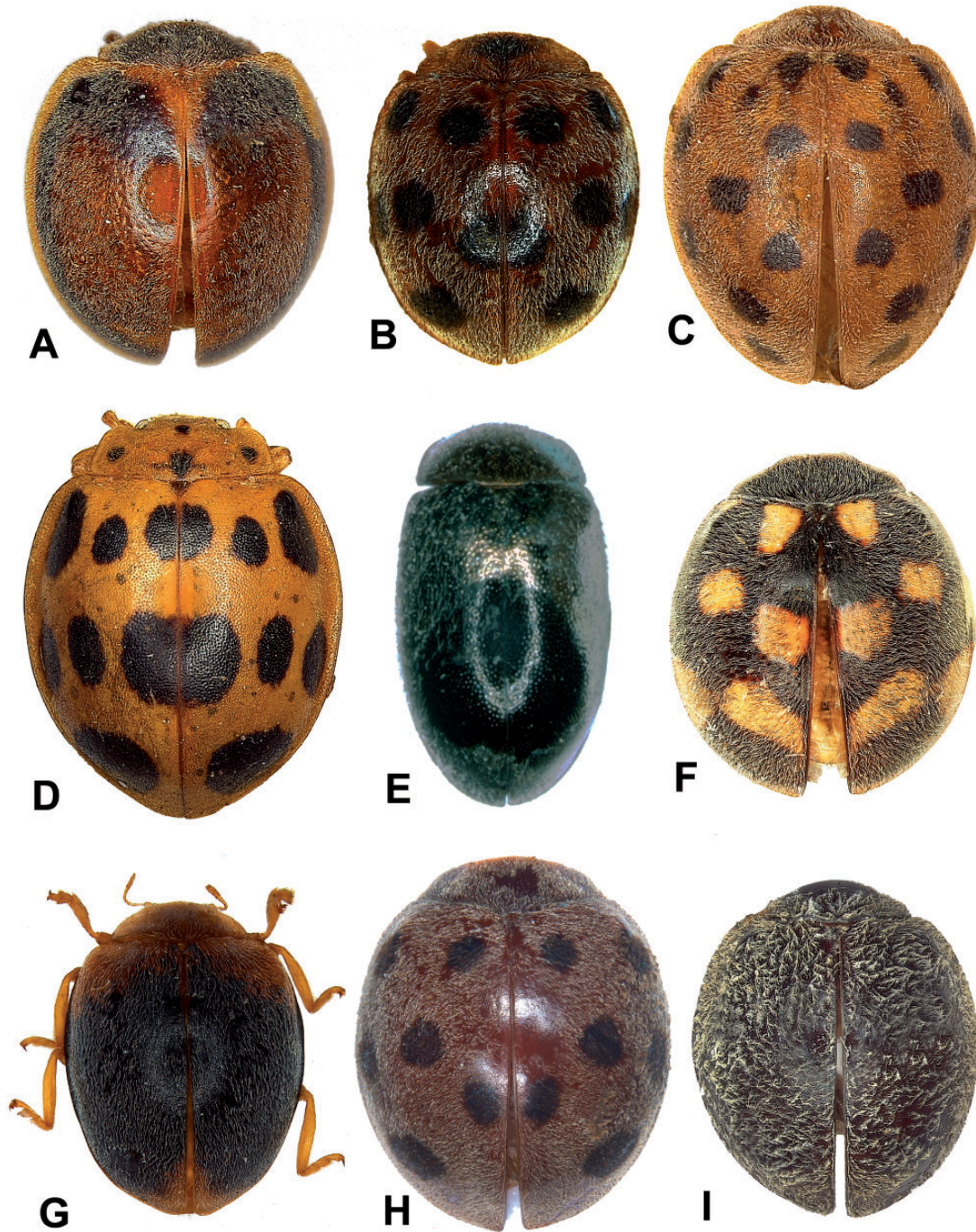


Fig. 82. Representatives of Epilachnini genera. (A) *Adira obscurocincta* Klug; (B) *Afidentula manderstjerane* (Mulsant); (C) *Cleta punctipennis* Mulsant; (D) *Epilachna borealis* (Fabricius); (E) *Eremochilus* sp.; (F) *Mada* sp.; (G) *Figura ruwenzorica* Szawaryn; (H) *Tropha variabilis* Weise; (I) *Pseudodira clypealis* Gordon.

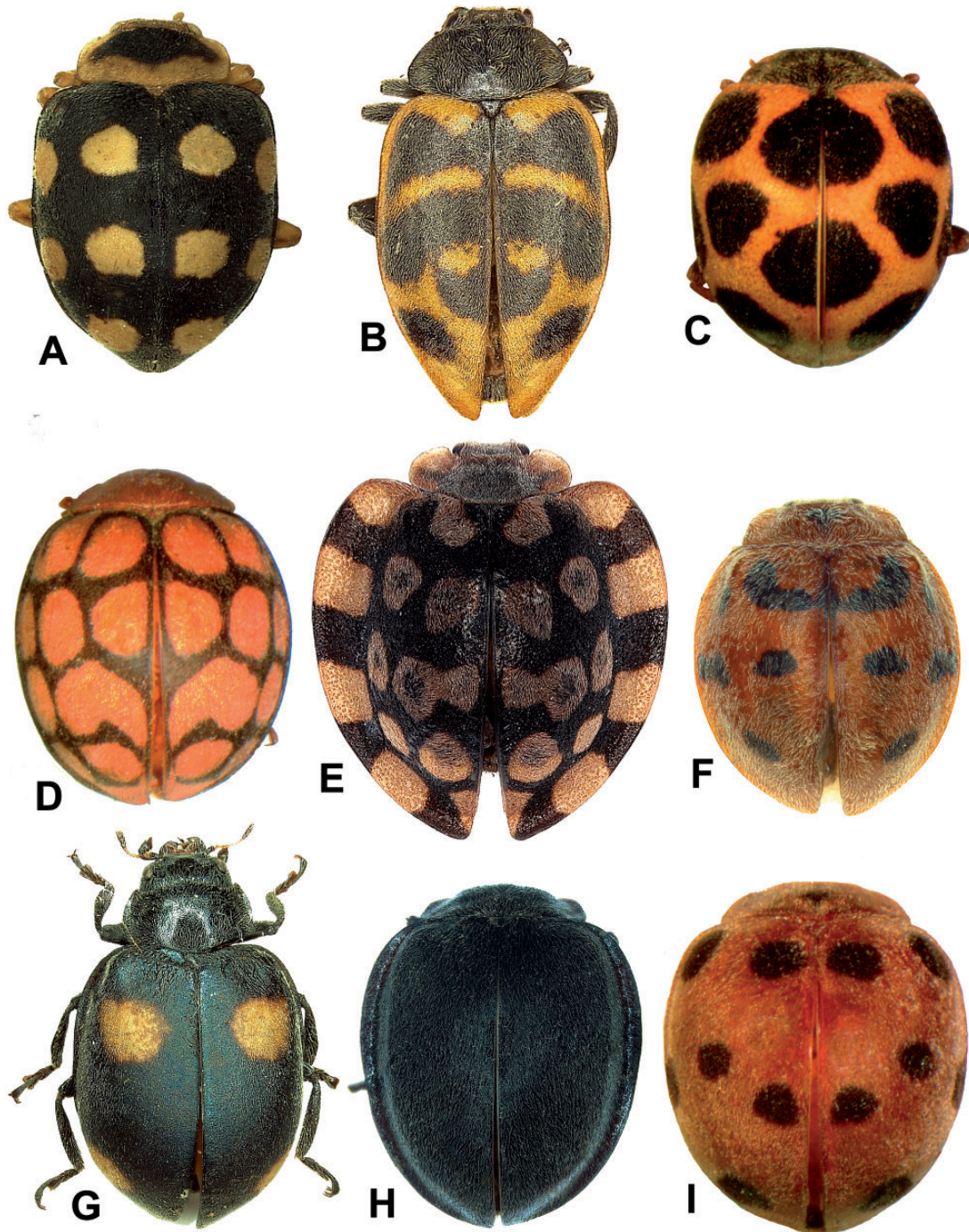


Fig. 83. Representatives of Epilachnini genera. (A) *Afissa parvula* (Crotch); (B) *Chnootriba similis* (Thunberg); (C) *Diekeana admirabilis* (Crotch); (D) *Solanophila dregei* (Mulsant); (E) *Epiverta chelonina* (Mader); (F) *Macrolasia arcula* Weise; (G) *Toxotoma cuzcoensis* Gordon; (H) *Papuaepilachna nasti* (Bielawski); (I) *Uniparodentata decipiens* (Crotch).

tubercles; molar part absent or rarely with molar tooth; prostheca well developed, setose. Maxilla (Fig. 79F) with cardo quadrate to weakly transverse reaching at most slightly outside of mouth cavity; stipes much longer than galea, in form of single sclerite with weak trace of suture or with suture between basistipes and mediostipes well visible; maxillary lacinia simple, its mesal surface simply setose; galea as long as wide or weakly elongate, mostly sclerotized, its ventral surface at least sparsely pubescent; terminal palpomere elongate, broadened apically. Submentum (Fig. 79A) transverse or

subquadrate with suture clearly visible; mentum (Fig. 79G) less than two times broader than long, widest at base, or sides subparallel; prementum oval, ligula shortly setose or with medio-apical brush of long setae or spines; labial palps (Fig. 79H) separated by distance distinctly less or equal to width of palpiger; apical palpomere as long as or longer than penultimate one and about as broad as penultimate palpomere.

Prothorax. Hypomeron simply/finely punctate. Prosternal process (Fig. 80D) smooth, without carinae. Prosternum in front of coxa

shorter than half length of coxal longitudinal diameter, anterior margin continuing as straight or arcuate line. Procoxal cavity with bordering line reaching laterally notosternal suture or without visible bordering line.

Pterothorax. Mesoventrite (Fig. 80E) with anterior edge weakly emarginate posteriorly, anterior margin entirely raised; mesoventral process smooth; meso-metaventral suture straight. Inner edge of metanepisternum smooth. Scutellum triangular, at least as long as broad. Metendosternite tendons separated by slightly less than width of stalk and placed on laminae. Elytra dually punctate; lateral margins at least narrow, entirely visible from above. Epipleuron (Fig. 80A) incomplete apically, smooth, its inner margin with bordering line extending at most to level of mid coxa or nearly complete, fading before base of elytra. Metaventral postcoxal lines (Fig. 80E) joined on metaventral process in straight or weakly arcuate line, laterally complete and distinctly recurved or straight.

Legs (Fig. 80A) long and slender with apices of mid and hind femora protruding from outer margin of elytral epipleuron or rarely more stout and not protruding from outer margin of elytral epipleuron. Fore and mid trochanters simple or angulately produced with weak cavities on their inner surfaces for receiving tip of tibiae in repose. Mid and hind coxae simple; mid and hind femora simple along inner edge; mid and hind femora on outer surface smooth, without carina (Fig. 80C). Tibial spurs: 1-2-2 or sometimes spurs absent. Tarsal claws double with large basal tooth (Fig. 80B).

Abdomen. Six ventrites in both sexes. Abdominal postcoxal lines recurved roundly or angulately, incomplete laterally, without additional line. In male: apical margin of ventrite 5 truncate (Fig. 81A) or emarginate; ventrite 6 emarginate (Fig. 81B); tergite VIII rounded (Fig. 81C) or truncate; apodeme of sternum IX rod-like, thin and long (Fig. 81D). Tergite X large, subtriangular, truncate or rounded at apex (Fig. 81D). In female: apical margin of ventrite 5 truncate or weakly sinuate (Fig. 81E); ventrite 6 (Fig. 81F) rounded or arcuate, sometimes truncate, with basal margin simply arcuate, longitudinally at middle not divided; tergite VIII rounded (Fig. 81G). Proctiger (TX) large, rounded or arcuate (Fig. 81K).

Male genitalia (Fig. 81H–J). Tegminal basal piece without spines. Penis guide symmetrical, as long as or slightly longer than parameres, at apex entire; outer edge smooth or serrate; inner edge without additional process. Parameres well developed, simple apically. Penis thin, long, straight or recurved at apex, its base with reduced T-shaped capsule.

Female genitalia (Fig. 81K). Sclerite anteriorly to coxites in membrane connected paraprocts absent. Coxites distinctly less than two times longer than wide, oval or almond-shaped; outer edge of coxite free or sometimes fused with paraprocts, inner edge simple—straight, rounded, or weakly emarginate, ventral surface smooth. Styli distinct or strongly reduced and hardly visible. Bursa copulatrix without sclerite, large, nondivided, ending with common oviduct, and with narrowing part of bursa leading to short sperm duct.

Distribution. Bismarck Is., Solomon Is., Aru Is., New Guinea, New Hebrides, Australia.

Species included (examined): *Papuaepilachna aruensis* (Crotch) **comb. nov.**, *P. biroi* (Weise) **comb. nov.**, *P. biwakana* (Bielawski), *P. buqueti* (Montrouzier) **comb. nov.**, *P. fulvimana* (Weise) **comb. nov.**, *P. guttatopustulata* (Fabricius) **comb. nov.**, *P. immaculata* (Bielawski) **comb. nov.**, *P. kapuri* (Bielawski), *P. karapensis* (Bielawski) **comb. nov.**, *P. nasti** (Bielawski), *P. orrori* (Bielawski) **comb. nov.**, *P. samuelsoni* (Jadwiszczak) **comb. nov.**, *P. slipinski* (Jadwiszczak) **comb. nov.**, *P. tenmana* (Bielawski), *P. watalai* (Jadwiszczak), *P. wiebesi* (Bielawski).

Comment. *Papuaepilachna* in the present sense includes species belonging to *Papuaepilachna* of Szawaryn and Tomaszewska (2013), Papuan species of *Henoseopilachna guttatopustulata* group (Dieke 1947) and *Lalokia* of Szawaryn and Tomaszewska (2013).

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References Cited

- Agassiz, L., and G. F. Erichson. 1845. Nomina systematica Generum Coleopterorum, tam viventium quam fossilium, secundum ordinem alphabeticum disposita, adjectis auctoribus, libris in quibus reperiuntur, anno editionis, etymologia et familiis ad quas pertinent. Sumtibus et Typis Jent et Gassmann, Soloduri, XII + 170 pp.
- Akadeh, M., and P. Shishehbor. 2011. Life history traits of melon ladybeetle, *Epilachna chrysomelina* (Coleoptera: Coccinellidae), on four host plant species. J. Entomol. Soc. Iran. 31:17–27.
- Aruggoda, A. G. B., R. Shunxiang, and Q. Baoli. 2010. Molecular phylogeny of ladybird beetles (Coccinellidae: Coleoptera) inferred from mitochondria 16S rDNA sequences. Trop. Agric. Res. 21:209–17.
- Bayene, Y., T. Hofsvang, and F. Azerefegne. 2007. Population dynamics of the *Epilachna (Chnootriba similis)* Thunberg (Coleoptera, Coccinellidae) in Ethiopia. Crop Protect. 26:1634–43.
- Bielawski, R. 1963. Monographie der Epilachninae (Coleoptera: Coccinellidae) der Australischen Region. Ann. Zool. 21:295–461.
- Bocak, L., C. Barton, A. Crampton-Platt, D. Chesters, D. Ahrens, and A. Vogler. 2014. Building the Coleoptera tree-of-life for >8000 species: composition of public DNA data and fit with Linnaean classification. Syst. Entomol. 39:97–110.
- Cao, C. Y., and N. Y. Xiao. 1984. New species of Coccinellidae from Yunnan, China. Entomotaxonomia. 6:109–32.
- Chapuis, M. F. 1876. Famille des Erotyliens, des Endomychides et des Coccinellides. In: T. Lacordaire and M.F. Chapuis (eds.), Histoire Naturelle des Insectes. Genera des Coléoptères ou exposé méthodique et critique de tour les genres proposés jusqu'ici dans cet ordre d'insectes, vol. 12. Paris, Roret, 424 pp.
- Chazeau, J. 1975. Nouvelles espèces d'Epilachninae de Madagascar (Coléoptères, Coccinellidae). 1re Note. Cahiers O. R. S. T. O. M., Série Biologie. 10:41–59.
- Chazeau, J. 1976. Nouvelles espèces d'Epilachninae de Madagascar (Coléoptères, Coccinellidae). 2ème Note. Cahiers O. R. S. T. O. M., Série Biologie. 11:69–84.
- Crowson, R. A. 1955. The natural classification of the families of Coleoptera. Nathaniel Lloyd, London, 187 pp.
- Crotch, G. R. 1874. A Revision of the Coleopterous Family Coccinellidae. E. W. Johnson, London, 311 pp.

- Dejean, P.F.M.A. 1837. Catalogue des Coléoptères de la Collection de M. le Comte Dejean. Troisième édition, revue, corrigée et augmentée. Méquignon-Marvis Pères et Fils, Paris, 503 pp.
- Dieke, G. H. 1947. Ladybeetles of the genus *Epilachna* (sens. lat.) in Asia, Europe and Australia. Smithsonian Miscellaneous Collections, Washington. 106:1–183.
- Fabricius, J. C. 1775. Systema Entomologiae, sistens Insectorum Classes, Ordines, Genera, Species, adiectis Synonymis, Locis, Descriptionibus, Observationibus. Officina Libraria Kortii, Flensburgi et Lipsiae, 822 pp.
- Fabricius, J. C. 1781. Species Insectorum exhibentes eorum differentias specificas, synonyma auctorum, loca natalia, metamorphosin adiectis observationibus, descriptionibus. Tom. I. Impensis Carol. Ernest. Bohnii, Hamburgi et Kilonii. VIII + 552 pp.
- Fürsch, H. 1963. Möglichkeiten zur Festlegung niederer systematischer Kategorien gezeigt an der *Epilachna-sahlbergi*-Gruppe. Veröffentlichungen Der Zoologischen Staatssammlung München. 7:161–287.
- Fürsch, H. 1964. Die Arten der Verwandtschaftsgruppe *Henosepilachna elaterii* (Rossi) (= *E. chrysomelina* auct.) (Coleoptera, Coccinellidae). Reichenbachia. 3:181–208.
- Fürsch, H. 1975. Beschreibung einiger neuer Coccinelliden aus dem Museum Tervuren (Coleoptera: Coccinellidae). Revue De Zoologie Et De Botanique Africaines, Bruxelles. 89:645–50.
- Fürsch, H. 1985. Die *Epilachna-canina*-Gruppe (Coleoptera—Coccinellidae). Entomologische Arbeiten Aus Dem Museum G. Frey Tutzing Bei München, Tutzing. 33:189–229.
- Fürsch, H. 1986. Die Madaini der alten Welt (Coleoptera, Coccinellidae). Revue De Zoologie Et De Botanique Africaines. 99[1985]:391–410.
- Fürsch, H. 1987. Neue Arten und Ergänzungen zur *Epilachna-sahlbergi*-Gruppe. Folia Entomologica Hungarica, Budapest. 48:29–38.
- Fürsch, H. 1991. Die Epilachnini Afrikas südlich der Sahara (Coleoptera: Coccinellidae). Entomofauna 12:217–316.
- Gannon, A. J., and C. E. Bach. 1996. Effects of soybean trichome density on Mexican bean beetle (Coleoptera: Coccinellidae) development and feeding preference. Environ. Entomol. 25:1077–1082.
- Giorgi, J. A., N. J. Vandenberg, J. V. McHugh, J. Forrester, A. Ślipiński, K. B. Miller, L. R. Shapiro, and M. F. Whiting. 2009. The evolution of food preferences in Coccinellidae. Biol. Control. 51:215–231.
- Gordon, R. 1975. A revision of the Epilachninae of the Western Hemisphere (Coleoptera: Coccinellidae). Technical Bulletin No 1493 United States Department of Agriculture, 409 pp.
- Gordon, R. D., and L. M. de Almeida. 1986. New species and comments on *Mada* Mulsant, 1850, *Pseudodira* Gordon, 1976 and other Epilachninae (Coleoptera, Coccinellidae) in the collection of the “Universidade Federal do Paraná”, Curitiba, Brazil. Revista Brasileira De Entomologia, São Paulo. 30:365–373.
- Gordon, R., and N. Vandenberg. 1987. Eremochilini, a new tribe of Neotropical Epilachninae (Coleoptera: Coccinellidae). J. N. Y. Entomol. Soc. 95:5–9.
- Gould, J. 1862. Descriptions of sixteen new species of birds from the island of Formosa, collected by Robert Swinhoe, Esq., Her Majesty's Vice-Consul at Formosa. Proc. Zool. Soc. Lond. 1862:280–286.
- Hardy, D. E. 1987. The Trypetini, Aciurini and Ceratitini of Indonesia, New Guinea and adjacent Islands of the Bismarcks and Solomons (Diptera: Tephritidae: Trypetinae). Entomography. 5:247–373.
- Herbst, J.F.W. 1786. Erste Mantis zum Verzeichniß der ersten Klasse meiner Insektenammlung. Archiv Der Insectengeschichte. 6:153–182.
- Hope, F. W. 1840. The Coleopterist's manual, part the third, containing various families, genera and species of beetles, recorded by Linnaeus and Fabricius, although descriptions of newly discovered and unpublished insects. Bridgewater, London, 191 pp.
- Hossain, M. S., A. B. Khan, M. A. Haque, M. A. Mannan, and C. K. Dash. 2009. Effect of different host plants on growth and development of *Epilachna* beetle. Bangladesh J. Agric. Res. 34:403–410.
- Howard, N. F. 1941. Feeding of the Mexican bean beetle larva. Ann. Entomol. Soc. Am.. 34:766–769.
- Hunt, T., J. Bergsten, Z. Levkanicova, A. Papadopoulou, O. John, R. Wild, P. M. Hammond, D. Ahrens, M. Balke, M. S. Caterino, et al. 2007. A comprehensive phylogeny of beetles reveals the evolutionary origins of a superradiation. Science 21:1913–1916.
- Hübner, J. 1819. Verzeichniß bekannter Schmettlingen. [Part 2]. Ben dem Verfasser zu finden, Augsburg, pp. 17–176.
- Jadwyszczak, A., and P. Węgrzynowicz. 2003. World Catalogue of Coccinellidae Part I—Epilachninae. Mantis, Olsztyn, 264 pp.
- Jakobson, G. G. 1915. Zhuki Rossii i Zapadnoy Evropy. Rukovodstvo k opredleniu zhukov. Vypusk 11. A.F. Devrjen, St.-Petersburg, pp. 865–1024. [in Russian].
- Kapur, A. P. 1958. Coccinellidae of Nepal. Records of the Indian Museum. 53[1955]:309–38.
- Klug, F. 1829. Preis-Verzeichniß vorräthiger Insectendoubletten des Königl. Zoologischen Museums der Universität, Berlin, 18 pp.
- Korschetsky, R. 1931. Coccinellidae I. In: S. Schenkling (ed.), Coleopterorum Catalogus. Part 118. W. Junk, Berlin, 224 pp.
- Kovář, I. 1996. Phylogeny. In: I., Hodek & A., Honek (eds.), Ecology of Coccinellidae. Kluwer Academic Publishers, Dordrecht, pp. 19–31.
- Kovář, I. 2007. Family Coccinellidae Latreille, 1807, pp. 568–631. In I., Lobl & A., Smetana (Ed.), Catalogue of Palaearctic Coleoptera, Vol. 4. Stenstrup, Apollo Books, 935 pp.
- Lawrence, J. F., A. Ślipiński, A. E. Seago, M. K. Thayer, A. F. Newton, and A. E. Marvaldi. 2011. Phylogeny of the Coleoptera based on morphological characters of adults and larvae. Ann. Zool. 61:1–217.
- Li, C. S., and E. F. Cook. 1961. The Epilachninae of Taiwan (Coleoptera: Coccinellidae). Pac. Insects. 3:31–91.
- Linnaeus, C. 1758. Systema Naturae per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Tomus I. Editio Decima, Reformata. Laurentii Salvii, Holmiae, 824 pp.
- Linnaeus, C. 1767. Systema Naturae per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Tomus I. Pars I. Editio Decima tertia, ad Editionem duodecimam Holmiensem. Typis Ioannis Thomae nob. De Tratterern, Vindobonae, pp. 533–1364.
- Lord, N., C. S. Hartley, J. F. Lawrence, J. V. McHugh, M. F. Whiting, and K. B. Miller. 2010. Phylogenetic analysis of the minute brown scavenger beetles (Coleoptera: Latridiidae), and recognition of a new beetle family, Akalyptoischidae fam. n. (Coleoptera: Cucujoidea). Syst. Entomol. 35:753–763.
- Mader, L. 1933. Über bekannte und neue Coccinelliden. Entomologischer Anzeiger, Wien. 13:79–84.
- Mader, L. 1941. Coccinellidae. I. Teil. Exploration du Parc National Albert. Mission G. F. de Witte (1933–1935). Fascicule 34. Bruxelles, 208 pp.
- Magro, A., E. Lecompte, F. Magné, J. L. Hemptinne, and B. Crouau-Roy. 2010. Phylogeny of ladybirds (Coleoptera: Coccinellidae): are the subfamilies monophyletic? Mol. Phylogenet. Evol. 54:833–48.
- Mulsant, E. 1846. Histoire Naturelle des Coléoptères de France. Sulcicolles-Sécuiripalpes. Maison, Paris, xxiv + 26 pp. + 280 pp. + 1 pl.
- Mulsant, E. 1850. Species des Coléoptères Trimères Sécuiripalpes. Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industrie, publiées par la Société nationale d'Agriculture, etc., de Lyon, Deuxième Série, Lyon, 2, 1104 pp.
- Mulsant, E. 1853. *Supplément a la Monographie des Coléoptères Trimères Sécuiripalpes*. Annales de la Société Linneenne de Lyon, Nouvelle Série, Lyon, 1 [1852–1853], 129–333.
- Nedvěd, O., and I. Kovář. 2012. Appendix: List of genera in tribes and subfamilies. In: I. Hodek, A. Honek, H.F. van Emden (eds.), Ecology and Behaviour of the Ladybird Beetles (Coccinellidae), pp. 526–531. John Wiley and Sons Ltd. Chichester, UK.
- Pang, X. F., and J. L. Mao. 1979. Economic Insect Fauna of China (XIV). Coleoptera: Coccinellidae II. Science Press, Beijing, 170 pp.
- Park, H. C., and I. B. Yoon. 1991. A taxonomic revision of subfamily Epilachninae in Korea (Coleoptera: Coccinellidae). Entomol. Res. Bull. (Korea). 17:81–92.
- Ren, S., X. Wang, H. Pang, Z. Peng, and T. Zeng. 2009. Colored Pictorial Handbook of Ladybird Beetles in China. Science Press, Beijing, 336 pp.
- Richards, A. M. 1983. The *Epilachna vigintioctopunctata* complex (Coleoptera: Coccinellidae). Int. J. Entomol. 25:11–41.
- Richards, A. M., and L. W. Filewood. 1988. The effect of agricultural crops and weeds on the bionomics of the pest species comprising the *Epilachna vigintioctopunctata* complex (Coleoptera, Coccinellidae). J. Appl. Entomol. 105:88–103.

- Robertson, J. A., M. F. Whiting, and J. V. McHugh. 2008. Searching for natural lineages within the Cerylonid Series (Coleoptera: Cucujoidea). *Mol. Phylogenet. Evol.* 46:193–205.
- Robertson, J., A. Ślipiński, M. Moulton, F. W. Shockley, A. Giorgi, N. P. Lord, D. D. McKenna, W. Tomaszewska, J. Forrester, K. B. Miller, et al. 2015. Phylogeny and classification of Cucujoidea and the recognition of a new superfamily Coccinelloidea (Coleoptera: Cucujiformia). *Syst. Entomol.* 40:745–778.
- Sasaji, H. 1968. Phylogeny of the family Coccinellidae (Coleoptera). *Etizenia* 35:1–37.
- Sasaji, H. 1971. Coccinellidae (Insecta: Coleoptera). *Fauna Japonica*. Academic Press of Japan, Tokyo, 16 pls, 345 pp.
- Schneider, D. H. 1792. Verzeichniss zur Beschreibung der in der Sammlung des Herausgebers befindlichen zur Gattung *Coccinella* gehörigen europäischen Käfer (Sonnen-Käfer oder Blattlaus-Käfer). *Neuestes Magazin Für Die Liebhaber Der Entomologie*. 2:128–256.
- Seago, A. E., J. A. Giorgi, J. Li, and A. Ślipiński. 2011. Phylogeny, classification and evolution of ladybird beetles (Coleoptera: Coccinellidae) based on simultaneous analysis of molecular and morphological data. *Mol. Phylogenet. Evol.* 60:137–151.
- Ślipiński, S. A. 2007. Australian ladybird beetles (Coleoptera: Coccinellidae). Their biology and classification. Australian Biological Resources Study, Canberra, 286 pp.
- Ślipiński, A., and W. Tomaszewska. 2010. Coccinellidae Latreille, 1802. In: R.A.B. Leschen, R.G. Beutel, and J.F., Lawrence (eds), *Handbook of Zoology*, Vol. 2, Coleoptera. Walter de Gruyter GmbH & Co. KG, Berlin/New York, pp. 454–472.
- Szawaryn, K. 2011. A new species of *Henosepilachna* Li (Coleoptera: Coccinellidae: Epilachnini) from New Guinea. *Ann. Zool.* 61:685–689.
- Szawaryn, K. 2014. Revision of the genus *Figura* (Coleoptera: Coccinellidae) with descriptions of new species. *Eur. J. Entomol.* 111:105–119.
- Szawaryn, K. 2015a. Notes on the genus *Mada* Gordon with a description of the new Andean species (Coleoptera: Coccinellidae: Epilachnini). *Zootaxa* 3936:281–286.
- Szawaryn, K. 2015b. Revision of the Neotropical genus *Pseudodira* (Coleoptera: Coccinellidae: Epilachnini). *Acta Entomol. Musei Natl. Pragae*. 55:203–215.
- Szawaryn, K., and W. Tomaszewska. 2013. Two new genera of Epilachnini Mulsant from New Guinea and Aru Islands (Coleoptera: Coccinellidae). *J. Nat. History*. 47:2427–2457.
- Szawaryn, K., and W. Tomaszewska. 2014. A contribution to *Macrolasia* Weise (Coleoptera: Coccinellidae: Epilachnini). *Zootaxa*. 3780: 577–584.
- Szawaryn, K., L. Bocak, A. Ślipiński, H. E. Escalona, and W. Tomaszewska. 2015. Phylogeny and evolution of phytophagous ladybird beetles (Coleoptera: Coccinellidae: Epilachnini), with recognition of new genera. *Syst. Entomol.* 40:547–569.
- Thomson, C. G. 1866. *Scandinaviens Coleoptera, Synoptiskt Bearbetade*. Tom VIII. Lund: Lundbergska Boktryckeriet. 420. + pp.
- Thomson, J. 1875. Geanderte Namen. *Coleopterologische Hefte*. 14:213.
- Thunberg, C. P. 1781. *Dissertatio Entomologica*. *Novas Insectorum Species, sistens cujus partem primam*, Cons. Exper. Facul. Med. Upsal., publ ice ventilandam exhibent praeses Caol. P. Thunberg, et respondens Samuel Casström. Joh. Edman, Direct. et Reg. Acad. Typogr., Upsaliae, 28 pp.
- Tomaszewska, W. 2000. Morphology, phylogeny and classification of adult Endomychidae (Coleoptera: Cucujoidea). *Ann. Zool.* 50:449–558.
- Tomaszewska, K. W. 2005. Phylogeny and generic classification of the subfamily Lycoperdininae with a re-analysis of the family Endomychidae (Coleoptera: Cucujoidea). *Ann. Zool.* 55:1–172.
- Tomaszewska, W., and K. Szawaryn. 2013. Revision of the Asian species of *Afidentula* Kapur, 1958 (Coleoptera: Coccinellidae: Epilachnini). *Zootaxa*. 3608:26–50.
- Tomaszewska, W., and K. Szawaryn. 2014. On African Epilachnini—a revision of the genus *Tropha* Weise (Coleoptera: Coccinellidae). *Ann. Entomol. Soc. Am.* 107:347–355.
- Ukrainsky, A. S. 2006. Five new replacement ladybird (Coleoptera: Coccinellidae) generic names. *Russ. Entomol. J.* 15:399–400.
- Vandenberg, N. J. 2002. Family 93. Coccinellidae Latreille 1807, 19 pp. In: R.H., Arnett, Jr., M.C., Thomas, P.E., Skelley, and J.H., Frank (eds.). *American Beetles*. Volume 2. Polyphaga: Scarabaeoidea through Curculionoidea. CRC Press LLC, Boca Raton, FL. xiv + 861 pp.
- Wang, H., and C. Y. Cao. 1993. Studies on the systematic position and generic relationship of the tribe Epilachnini (Coleoptera: Coccinellidae) from Yunnan. *Zool. Res.* 14:118–127.
- Wang, X., W. Tomaszewska, and S.-X. Ren. 2014. A new species and first record of the genus *Cynegetis* Chevrolat (Coleoptera, Coccinellidae, Epilachnini) from China. *Zookeys*. 448:37–45.
- Wang, X., W. Tomaszewska, and S.-X. Ren. 2015. A contribution to Asian *Afidentula* Kapur (Coleoptera, Coccinellidae, Epilachnini). *Zookeys* 516:35–48.
- Weise, J. 1898. Coccinelliden aus Kamerun. *Deutsche Entomologische Zeitschrift*, Berlin. 1898:97–125.
- Weise, J. 1900a. Coccinelliden aus Süd-Amerika. *Deutsche Entomologische Zeitschrift*, Berlin. 1899:257–272.
- Weise, J. 1900b. Kurze Mitteilungen über ostafrikanische Coccinelliden und Beschreibungen neuer Arten. *Deutsche Entomologische Zeitschrift*, Berlin. 1900:113–131.
- Weise, J. 1901. Coccinelliden aus Ceylon gesammelt von Dr. Horn. *Deutsche Entomologische Zeitschrift*, Berlin. 1900:417–445.
- Weise, J. 1903. Neue Coccinelliden. *Deutsche Entomologische Zeitschrift*, Berlin. 2:229–232.
- Weise, J. 1906. Zwei neue Coccinelliden. *Deutsche Entomologische Zeitschrift*, Berlin. 1906: 159–60.
- Weise, J. 1912. Über Hispinen und Coccinelliden. *Archiv Für Naturgeschichte*, Berlin. 78: 100–20.
- Wiedemann, C. R. W. 1824. *Analecta entomologica ex Museo Regio Havniensi maxime congesta profert iconibusque illustrat*. A Regio Typographeo Scholarum, Kiliae. 60. pp.
- Zhang, X. N., and X. H. Ou. 2010. Fauna of some species of phytophagous ladybirds Epilachninae (Coleoptera: Coccinellidae) in Yunnan province. *Entomotaxonomia*. 32:53–60.