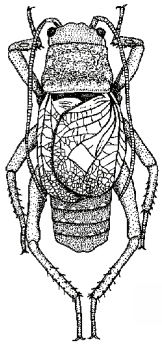


Far Eastern Entomologist

Дальневосточный энтомолог

Journal published by Far East Branch of the Russian Entomological Society and Laboratory of Entomology, Federal Scientific Center of the East Asia Terrestrial Biodiversity, Vladivostok

Number 504: 1-25 | ISSN 1026-051X (print edition) ISSN 2713-2196 (online edition) | August 2024

https://doi.org/10.25221/fee.504.1
https://elibrary.ru/wvjtey
https://zoobank.org/References/BED031AD-06A5-49E4-B811-30B195A6A00B

REVIEW OF THE VELVET ANTS (HYMENOPTERA: MUTILLIDAE) OF WALLACEA WITH SPECIAL REFERENCE TO LOMBOK, INDONESIA

A. S. Lelej

Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far East Branch of the Russian Academy of Sciences, Vladivostok, 690022, Russia. E-mail: lelej@biosoil.ru

Summary. Fifty-eight species in 18 genera from Wallacea are reviewed. *Yamanetilla* Lelej, *Krombeinidia* Lelej, and *Mickelomyrme palawanensis* (Mickel, 1934) are new to Wallacea; five new species are described from Lombok: *Bischoffitilla mickeli* **sp. n.** ♂; *Smicromyrme brothersi* **sp. n.**, ♀; *K. mokrousovi* **sp. n.**, ♀; *K. wallacei* **sp. n.**, ♀; *Promecidia lombok* **sp. n.**, ♂; and one from Sulawesi: *Y. yamanei* **sp. n.**, ♂ ♀. A new synonymy is proposed for *Smicromyrme minahassae* (Zavattari, 1914) =*S. electra* Mickel, 1935, **syn. n.**; *Neotrogaspidia menadoensis* (Mickel, 1935), **stat. n.** et **comb. n.** =*Timulla* (*Trogaspidia*) *implicata* Mickel, 1935, **syn. n.;** *Promecidia thoracica* (Smith, 1860), **comb. n.** =*Mutilla bonthainensis* André, 1896, **syn. n.;** *Protrogaspidia neglecta* (Smith, 1860), **comb. n.** =*M. celebensis* André, 1905, **syn. n.** Full taxonomic status is proposed for *Trogaspidia rubiginosa* (André, 1896), **stat. n.** and *T. melanesia* (Mickel, 1935), **stat. n.** Keys are given for the Wallacean species of *Mickelomyrme*, *Krombeinidia* and *Neotrogaspidia*. Eleven species in eight genera are recorded from the island of Lombok.

Key words: taxonomy, new species, new synonymy, new record, color syndrome, Wallacea.

А. С. Лелей. Обзор ос-немок (Hymenoptera: Mutillidae) региона Уоллесия с особым вниманием к острову Ломбок, Индонезия // Дальневосточный энтомолог. 2024. N 504. С. 1-25.

Резюме. Дан обзор 58 видов из 18 родов биогеографического региона Уоллесия. *Yamanetilla* Lelej, *Krombeinidia* Lelej и *Mickelomyrme palawanensis* (Mickel, 1934) указаны впервые для Уоллесии; описано пять новых видов с Ломбока: *Bischoffitilla mickeli* **sp. n.** ♂; *Smicromyrme brothersi* **sp. n.**, ♀; *K. mokrousovi* **sp. n.**, ♀; *K. wallacei* **sp. n.**, ♀; *Promecidia lombok* **sp. n.**, ♂ и один с Сулавеси: *Y. yamanei* **sp. n.**, ♂ ♀. Предложена новая синонимия для *Smicromyrme minahassae* (Zavattari, 1914) =*S. electra* Mickel, 1935, **syn. n.**; *Neotrogaspidia menadoensis* (Mickel, 1935), **stat. n.** et **comb. n.** =*Timulla* (*Trogaspidia*) *implicata* Mickel, 1935, **syn. n.;** *Promecidia thoracica* (Smith, 1860), **comb. n.** =*Mutilla bonthainensis* André, 1896, **syn. n.;** *Protrogaspidia neglecta (*Smith, 1860), **comb. n.** =*M. celebensis* André, 1905, **syn. n.** Предложен видовой статус для *Trogaspidia rubiginosa* (André, 1896), **stat. n.** и *T. melanesia* (Mickel, 1935), **stat. n.** Даны определительные таблицы для видов из Уоллесии родов *Mickelomyrme*, *Krombeinidia* и *Neotrogaspidia*. Для острова Ломбок указаны 11 видов из восьми родов.

INTRODUCTION

Wallacea is a biogeographical region in the centre of the Indonesian archipelago, between Wallace's line in the west and Lydekker's line in the east. This biogeographical zone (Fig. 1) is bordered by two other biogeographical realms, Indo-Malayan and Australasian (Michaux, 2010). Deep ocean currents separate this region from the two biogeographical realms, acting as a dispersal barrier for many animals (Ngakan *et al*., 2023). Wallacea is a hotspot in central Indonesia and Timor-Leste in Southeast Asia. The region's thousands of islands support highly diverse biological communities with many unique species. Savannas and grasslands are found throughout Wallacea in the driest areas, but are extensive in the Lesser Sundas. (Conservation International, 2014). Wallacea is usually considered to be the eastern part of the Oriental Region, sometimes combined with the Australian Region to form the Australasian Region (Brothers, 2022).

Frederick Smith was the pioneer in the study of the Mutillidae of Wallacea (Smith, 1859, 1860a, 1860b, 1863). He studied the material collected by A. Wallace and described 20 species from this region in the genus *Mutilla* Linnaeus, 1758. Clarence Mickel in his valuable work made the revision and prepared the key to the species of the Mutillidae of the Pacific Islands and described 16 species in five genera from the Wallacea (Mickel, 1935). Finally, Denis Brothers in his monograph on Australasian Mutillidae listed 53 nominal species and 14 genera in Wallacea with photographs of type material (Brothers, 2022).

This paper continues my study of Oriental Mutillidae in recent years (Lelej, 2020a,b, 2021a,b, 2023a,b). In this paper, 58 valid species in 18 genera from the

Wallacean region are reviewed, the genera *Yamanetilla* Lelej, 1996 and *Krombeinidia* Lelej, 1996 are newly recorded from Wallacea and six new species are described. Eleven species (including five new species) in eight genera are recorded from Lombok. The classification of Mutillidae follows Brothers and Lelej (2017), with updates suggested by Waldren *et al.* (2023). The key to the oriental genera is given by Lelej (2005).

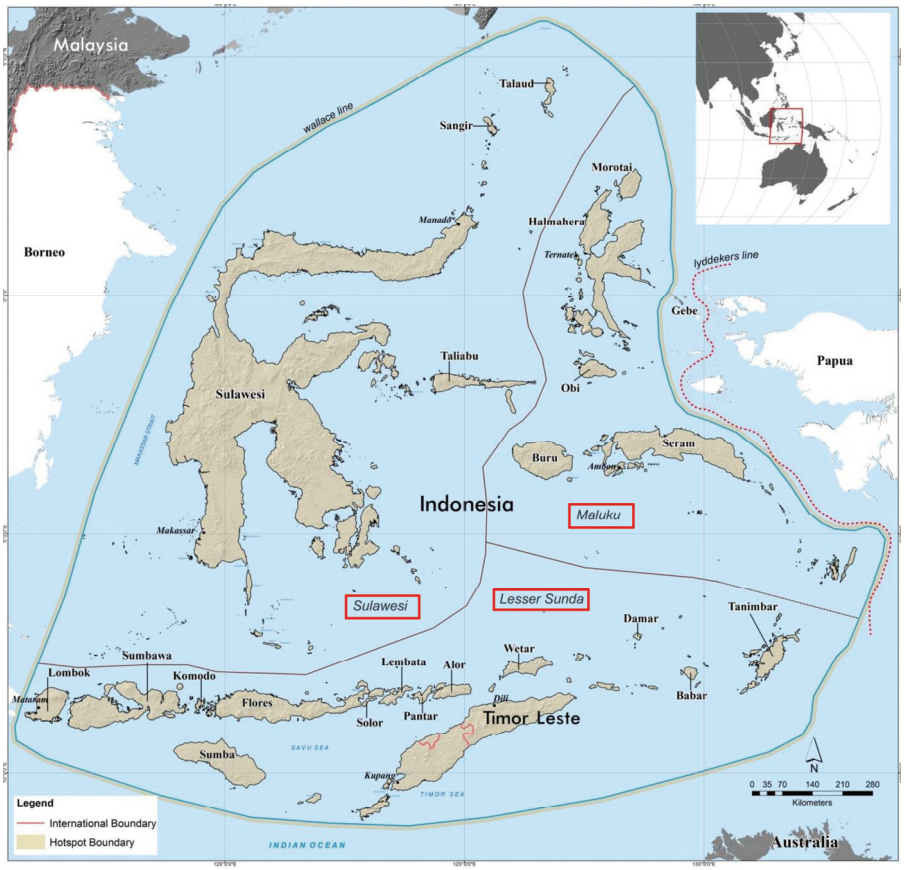


Fig. 1. Wallacea and biogeographical subregions (Conservation International, 2014). Biogeographical subregions (red quadrangles): Maluku, Lesser Sunda, Sulawesi (Coates & Bishop, 1997).

MATERIAL AND METHODS

There are 73 specimens collected by M.M. Mokrousov (Lobachevsky State University of Nizhny Novgorod, Russia) during his trip to the island of Lombok in 2012. Seiki Yamane (Kagoshima, Japan) visited the island of Sulawesi several times and collected some mutilids. The comparative material from different museums was also

examined. The following abbreviations are used to denote the institutions housing the species and specimens studied here:
HNHM: Hungarian Natural History Museum, Budapest, Hungary.
IBSS: Federal Scientific Center of the East Asia Terrestrial Biodiversity (formerly Institute of Biology and Soil Science), Vladivostok, Russia.
MSNG: Museo Civico di Storia Naturale "Giacomo Doria", Genoa, Italy.
MRSN: Museo Regionale di Scienze Naturali, Turin, Italy.
NHMW: Naturhistorisches Museum Wien, Vienna, Austria.
OUMNH: Oxford University Museum of Natural History, Oxford, England, U.K.
SEHU: Hokkaido University Insect Collection, Sapporo, Japan.
SKYC: Seiki Yamane Collection of Mutillidae, temporarily deposited in IBSS, Vladivostok, Russia.
USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.
ZIN: Zoological Institute, Russian Academy of Sciences, St Petersburg, Russia.
ZMHB: Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Berlin, Germany.

The photographs were taken with an Olympus SZX16 stereomicroscope and an Olympus DP74 digital camera, and then stacked using Helicon Focus software. The final illustrations were post-processed for contrast and brightness using Adobe® Photoshop® software. The following abbreviations are used in the text: F = flagellomere, S = metasomal sternum; T = metasomal tergum.

TAXONOMY

Subfamily Sphaeropthalminae

Genus *Ascetotilla* Brothers, 1971

DIVERSITY AND DISTRIBUTION. Eight Australasian species are recognized. One of these, *A. carinata* (Smith, 1859), is known from Wallacea (Indonesia: Aru, Morotai, New Guinea) (Brothers, 1971).

Genus *Ephutomorpha* André, 1902

DIVERSITY AND DISTRIBUTION. One hundred and seventy-seven Australasian species are recognized. One of these, *E. damia* (Smith, 1863), is known from Wallacea (Indonesia: Ceram) (Brothers, 2022).

Genus *Eurymutilla* Ashmead, 1899

DIVERSITY AND DISTRIBUTION. Nine Australasian species are recognized, three of them are known from Wallacea (Brothers, 2022):
Eurymutilla sumbawae (Zavattari, 1914); Indonesia (Sumbawa).
Eurymutilla thera (Smith, 1863); Indonesia (Seram).

Eurymutilla curta (André, 1896)

Mutilla (*Sphaerophthalma* [sic]) *curta* André, 1896a: 92, ♀.
Ephutomorpha curta: André, 1902: 49, ♀.
Eurymutilla curta: Lelej, 2005: 108, ♀; Brothers, 2022: 50, fig. 89, ♀.

MATERIAL EXAMINED. **Indonesia**: Ternate, Marikurubu, Gn. Gamalama, 700–1500 m, 29.X 1999, 2♀ (A. Riedel); Morotai, W Daruba, Raja, ~250 m, 16.XI 1999, 1♀ (A. Riedel).

DISTRIBUTION. Indonesia (Ambon, Buru, Morotai, New Guinea, Seram, Taliabu, Ternate).

Subfamily Myrmillinae

Genus *Bischoffitilla* Lelej, 2002

DIVERSITY AND DISTRIBUTION. Four Australasian species are recognized in Wallacea, three of them from Sulawesi (Brothers, 2022) and one new species from Lombok. A key to the Indonesian species is given in Sutanto *et al.* (2021).

Bischoffitilla deserta (Smith, 1879); Indonesia (Java, Kangean, Sulawesi), Philippines (Luzon).

Bischoffitilla facilis (Smith, 1860); Indonesia (Sulawesi).

Bischoffitilla multidentata (André, 1896); Indonesia (Sulawesi); type locality = Indonesia (Sumatra).

Bischoffitilla mickeli **Lelej, sp. n.**

https://zoobank.org/NomenclaturalActs/FAA23079-F975-440D-9290-AAAE6C273FEA

Figs 2–4

MATERIAL EXAMINED. Holotype, ♂, **Indonesia**: Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2′57.8″E, 9.V 2012 (MM). Paratypes, same data as holotype, 1♂; same place, 21.V 2012, 2♂ (MM).

DIAGNOSIS. MALE. Forewing with two submarginal cells. Mesosoma ferruginous with black pronotum. T2 entirely black. S2 without longitudinal median carina. S8 with well developed subbasal lateral carinae which are not connected. FEMALE. Unknown.

DESCRIPTION. Body length 5.6–10.4 mm. Mandible tridentate with subbasal denticle on inner border. S6 with small lateroapical tubercle. S8 (hypopygium) with well developed subbasal lateral carinae which are not connected.

DISTRIBUTION. Indonesia (Lombok).

ETYMOLOGY. The specific name is dedicated to the famous hymenopterist Clarence Mickel (1892-1982), who made important contributions to the study of Oriental Mutillidae. Treat as a noun in apposition.

REMARKS. In the key of Sutanto *et al*. (2021) this species ends in couplet 1 (*Bischoffitilla palaca* (Cameron, 1902)) because of forewing with two submarginal

cells, but differs from it by T2 with black apical part (T2 with a narrow, pale yellow, integumental stripe at apical margin in *palaca*). In the key of Mickel (1935) this species ends in couplet 18 (*Squamulotilla teuta teuta* (Mickel, 1934)) with T2 entirely black and mesosoma largely ferruginous, but differs by S2 without longitudinal median carina and pronotum black (S2 with longitudinal median carina and pronotum ferruginous in *teuta*).

Subfamily Odontomutillinae

Genus *Odontomutilla* Ashmead, 1899

DIVERSITY AND DISTRIBUTION. Nine Australasian species are recognized, six of them are known from Wallacea (Brothers, 2022):
Odontomutilla apiastra Mickel, 1935; Indonesia (Bacan, Halmahera).
Odontomutilla ceramensis Mickel, 1935; Indonesia (Pulau Seram).
Odontomutilla manifesta (Smith, 1859); Indonesia (Kepualauan Aru, New Guinea).
Odontomutilla semifasciata (André, 1896); Indonesia (Solor, Sulawesi, New Guinea).
Odontomutilla simplicifascia (Sichel et Radoszkowski, 1869); Indonesia (Halmahera).
Odontomutilla smithi Mickel, 1935; Indonesia (Sulawesi).

Genus *Yamanetilla* Lelej, 1996

DIVERSITY AND DISTRIBUTION. Seven species are recognized from the Oriental and eastern Palaearctic regions (Lelej, 2005). The genus is newly recorded from Wallacea with one new species.

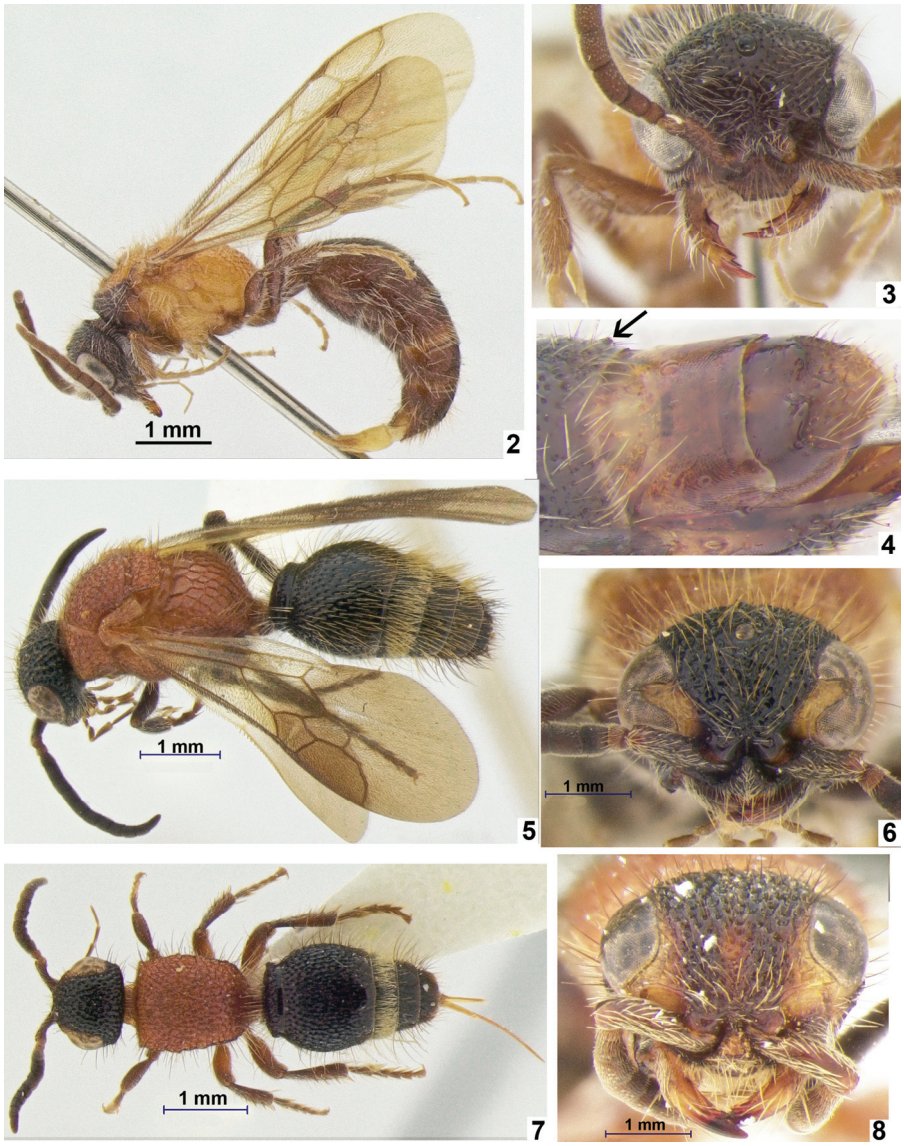
Yamanetilla yamanei **Lelej, sp. n.**
https://zoobank.org/NomenclaturalActs/92C7D17A-56A6-42A0-97BC-E3AE2C4FF6D9
Figs 5–8

MATERIAL EXAMINED. Holotype, ♀, **Indonesia**: SULAWESI, Gorontalo Prov., Mts. Tilogkabilu, 150–250 m, 31.I 2010 (Sk. Yamane) [SKYC]. Paratypes, same place, ~ 500 m, 2.II 2010, 1♂ (K. Takasuka) [IBSS]; same place, 100 m, 27.I 2010, 1♀ (Sk. Yamane) [IBSS]; same place, ~800 m, 30.I–1.II 2010, 1♀ (N. Ohbayashi) [SKYC]; Celebes [Sulawesi], Sulawesi Tengah Prov., Palu vicinity, 28.VIII 1985, 1♀ (JD Weintraub) [USNM].

DIAGNOSIS. MALE. Head black with yellowish spot inside eye. FEMALE. Head black with yellowish spot below eye.

DESCRIPTION. MALE. Body length 6.1 mm. Median triangular area of clypeus raised. Scape below with single carina. Gular margins distinctly carinate and elevated to a distinct tooth. Mesosoma ferruginous, pronotum, mesonotum and scutellum with sparse, pale setae. Humeral angles of pronotum angulate, not prominent; lateral margins of pronotum straight. Parapsidal furrows of mesonotum absent. Posterolateral angles

of scutellum produced into a short, subspinose process. Posterolateral angles of propodeal dorsum not produced at all, evenly rounded into posterior face, latter and propodeal



Figs 2–8. Mutillidae. 2–4 – *Bischoffitilla mickeli* **sp. n.**, ♀ (2, 3 – holotype, 4 – paratype); 5–8 – *Yamanetilla yamanei* **sp. n.**, paratypes (5, 6 – ♂, 7, 8 – ♀). 2, 5 – habitus, laterodorsal view; 7 – habitus, dorsal view; 3, 6, 8 – head, face view; 4 – S6–8, lateroventral view, arrow shows lateroapical tubercle on S6.

dorsum broad, deeply reticulate. Wings fuscous. T2 disc sparsely punctured, glabrous, laterally and anteriorly densely punctured. T3 with small, distinct punctures, and with band of dense, appressed, pale setae, somewhat constricted medially. T4-6 with small, dense, distinct punctures, except impunctate, glabrous, broad posterior margin of each. T7 with large, dense, confluent punctures throughout. S8 (hypopygium) with small, dense, confluent punctures throughout.

FEMALE. Body length 4.8-6.4 mm. Head black with yellowish spot below eye. Mesosoma and legs ferruginous, metasoma black. Median triangular area of clypeus elevated. Antennal tubercles strongly carinate above, carinae connected by a transverse carina. Humeral pronotal angles angulate, not prominent. Lateral margins of mesonotum broadly angulate anteriorly, mesosoma widest at this angulation, with sides gradually converging posteriorly. Mesosoma dorsally with dense, confluent punctures and sparse, erect and recumbent, ferruginous setae. Scutellar scale absent. Lateral margins of posterior propodeal face slightly denticulate anteriorly. T2 without setal fovea on anterolateral angles. Anterior surface of T1 with sparse, erect pale and recumbent fuscous setae; anterior half of dorsum of T1 with dense, confluent punctures, and sparse, erect, fuscous setae, posterior half glabrous, impunctate. Anterior 2/3 of T2 with moderate, dense, confluent punctures, becoming smaller and closer in posterior third, distal margin of T2 glabrous, impunctate. T2 with sparse, erect and recumbent, blackish setae, except lateral fourths with sparse, pale setae. T3 with complete, uninterrupted band of pale setae, with small, dense, shallow punctures anteriorly. T4-5 with small, shallow, close, confluent punctures, except for the broad distal margin of each, glabrous and impunctate, with sparse, erect and recumbent, fuscous setae. T6 densely punctate throughout, with sparse, pale setae.

DISTRIBUTION. Indonesia (Sulawesi).

ETYMOLOGY. I am pleased to name this new species in honour of Seiki Yamane, an expert in wasp and ant taxonomy, who collected the holotype of this species. Treat as a noun in apposition.

REMARKS. The male and female of this new species can be distinguished from all other congeners by the yellowish spot inside the eye of the male and below the eye of the female. The collection of male and female at the same site in Sulawesi allows me to treat them as opposite sexes of the same species. Furthermore, the genus *Yamanetilla* is represented on Sulawesi by one species of male and one species of female. There is no direct evidence for this relationship.

Subfamily Mutillinae

Tribe Smicromyrmini Bischoff, 1920

Genus *Andreimyrme* Lelej, 1995

DIVERSITY AND DISTRIBUTION. The genus includes 20 species, distributed mainly in the Oriental region. One species is recognized from Wallacea (Sulawesi): *A. silvorientalis* Okayasu, 2021 (Okayasu *et al*., 2021).

Genus *Mickelomyrme* Lelej, 1995

DIVERSITY AND DISTRIBUTION. The 22 species of this genus are mostly limited to the Oriental Region (Pagliano *et al*., 2020), two of them are known from Wallacea.

Key to the Wallacean species

1. Males 2
– Females 3
2. Mandibles with a high carina on the proximal half of the dorsal surface, the small tooth within subapical; clypeus without a median, longitudinal, sharp ridge .... *M. palawanensis* (Mickel, 1934)
– Mandibles without a high carina on the proximal half of the dorsal surface, the inner tooth remote from the apex; clypeus with a median, longitudinal, sharp ridge .... *M. zebina* (Smith, 1860)
3. Pale pubescent spots of T2 in a transverse row; T3 and T4 entirely pale pubescent .... *M. palawanensis* (Mickel, 1934)
– Median, anterior, pale pubescent spot of T2 distinctly anterior to the lateral spots; only T3 entirely pale pubescent, T4 with pale pubescence laterally ..... *M. zebina* (Smith, 1860)

Mickelomyrme palawanensis (Miclel, 1934)

Smicromyrme palawanensis Mickel, 1934: 206, ♂, type locality: "Puerto Princesa" (Philippines: Palawan) [USNM]; Tsuneki *et al*., 1993: 20, Figs 59–64, ♂.
Mickelomyrme palawanensis: Lelej, 2005: 44, ♂; Pagliano *et al*., 2020: 175.

MATERIAL EXAMINED. **Indonesia**: Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2′57.8″E, 9.V 2012, 1♂ (MM); same place, 21, 22.V 2012, 3♂ (MM); Senggigi, hotel, 8º28′58.6″S 116º2′12.9″E, 14.V 2012, 1♂ (MM); Lombok, Kokok Putih River, 8º15′19.3″S 116º28′38.5″E, 20.V 2012, 2♀, 1♂ (MM).

DISTRIBUTION. Indonesia* (Lombok), Philippines (Palawan, Mindanao).

REMARKS. The differences between the female of *M. palawanensis* and the female of *M. zebina* can be seen in the key above. Collecting females and males at the same site on Lombok allows me to treat them as opposite sexes of the same species. There is no direct evidence (pair collected *in copula*) to support this relationship. It is possible that the female of *Smicromyrme aborlana* Tsuneki, 1993 described from Palawan (Tsuneki *et al.*, 1993), which is similar to the female of *M. palawanensis* (Mickel, 1934) collected on Lombok, is a synonym of the latter.

Mickelomyrme zebina (Smith, 1860)

Mutilla zebina Smith, 1860b: 115–116; ♀, holotype, "Bac[hian]" [Indonesia, Maluku Utara, Pulau Bacan] [OUMHN]; Brothers, 2022: 172, fig. 336, ♀.
Smicromyrme zebina: Mickel, 1934: 189, 204, ♀♂; 1935: 292; Tsuneki *et al.*, 1993: 21, Figs 65–71, ♀♂.
Mickelomyrme zebina: Lelej, 2005: 45; Pagliano *et al*., 2020: 175; Okayasu, 2020: 54, ♂; Pagliano *et al*., 2020: 175; Brothers, 2022: 172, ♀.

MATERIAL EXAMINED. **Indonesia**: Sulawesi, Gorontalo Lombong, Bogani Nani Wartabone N.P., 31.VIII 2008, 1♀, Sk. Yamane [SKYC]; Gorontalo Prov., Mts. Tilongkabila, 100–200 m, 2.II 2010, 1♀, Sk. Yamane [SKYC]; 20 km NE Palu, 5 km W Tawaeli, 250 m., 0º43′45″S, 119º55′95″E, 2.III 2009, 1♀, A. Weigel [IBSS].

DISTRIBUTION. Brunei, Indonesia (Bacan, Sulawesi, Kalimantan Timur), Philippines, Malaysia (Sabah, Sarawak).

REMARKS. The distribution of *M. zebina* is probably limited by Wallacea.

Genus *Nordeniella* Lelej, 2005

DIVERSITY AND DISTRIBUTION**.** Six species have been recognized from India, Sri Lanka and Thailand (Williams *et al.*, 2019), and one species has recently been discovered in Wallacea (Okayasu, 2022) and newly recorded from Lombok.

Nordeniella sumbawaensis Okayasu, 2022

Nordeniella sumbawaensis Okayasu, 2022: 57, Figs 1-6, ♀, Indonesia: Sumbawa / 08°48′50″S 117°19′45″E / Desa Tatebal, / Kecamatan Ropang, // Kabupaten Sumbawa / Besar, Propinsi Nusa / Tenggara Barat (NTB) / 9.Nov.2000, M. Ohara." [SEHU].

MATERIAL EXAMINED. **Indonesia**; Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2,96′E, 9.V 2012, 1♀ (MM); same place, 18.V 2012, 2♀ (MM).

DISTRIBUTION. Indonesia (Lombok*, Sumbawa).

Genus *Smicromyrme* Thomson, 1870

DIVERSITY AND DISTRIBUTION. Two hundred and seventy-two species are recognized from the Palaearctic (113), Afrotropical (90) and Oriental (70) regions (Lelej & Williams, 2023), but two species have been described in males from Wallacea (Sulawesi): *S. electra* Mickel, 1935 and *S. minahassae* (Zavattari, 1914). According to B. Petersen's identification label attached to the male holotype of *S. electra* Mickel, 1935 (Brothers, 2022), this species is a junior subjective synonym of *S. minahassae* (Zavattari, 1914). An unusual new female species (T2 without basal medial setal spot) is found in Lombok.

Smicromyrme brothersi sp. n.

https://zoobank.org/NomenclaturalActs/846A310C-56E9-47D9-8D1C-25F97368C027

Figs 9–11

MATERIAL EXAMINED. Holotype ♀, **Indonesia**, Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2,96′E, 18.V 2012 (MM) [IBSS]. Paratypes, same place, 9.V 2012, 1♀ (MM); 18.V 2012, 4♀ (MM); same place, 22.V 2012, 1♀ (MM).

DIAGNOSIS. FEMALE. Differs from all oriental congeners in the absence of the medial basal spot on T2. MALE. Unknown.

DESCRIPTION. FEMALE. Body length 4.8-6.0 mm. Head black, brownish beneath, mandible, clypeus and antenna largely brown. Mesosoma ferruginous, femora and tibia brownish. Metasoma black. Body setae generally sparse and silvery, except vertex, T2 and T4-5 with blackish setae; mesosomal dorsum with reddish setae and T1 apex, T2 apical band, T3 entire and T6 laterally with dense whitish-silvery setae. Head. Width behind eye equal to width of pronotum. Frons, vertex and genae with separate punctures. Mandibular apex obscurely bidentate. Clypeus with narrow, transversely medially emargined lamella; basomedial part with carinae forming tubercle. Antennal scrobe without dorsal carina. Antennal tubercle smooth. Genal carina obliterated. F1 1.2 × pedicel length, F2 1.3 × pedicel length. Mesosoma. Length 1.3 × maximum width. Dorsum of mesosoma with coarse confluent punctures. Side of mesosoma with scattered moderate punctures with appressed setae, interspaces mostly smooth, propodeal side with distinct reticulation posteriorly. Mesopleural lamella absent. Humeral carina simple, rounded dorsally. Scutellar scale transversely arcuate, ~4 punctures wide. Lateral and posterior propodeal surfaces separated by slightly wavy carina. Metasoma. T1-5 with small dense punctures, less on T1. S1 with simple longitudinal carina. T2 felt line 0.5 × total length of T2. T6 with long ovate pygidium; with parallel striae (16 at widest point), posterior fifth smooth. S6 posterior margin bidentate.

DISTRIBUTION. Indonesia (Lombok).

ETYMOLOGY. I am pleased to name this new species in honour of Denis Brothers, world authority on the classification and evolution of Mutillidae and Aculeate and my best colleague. Treat as noun in apposition.

Genus *Tsunekimyrme* Lelej, 1995

DIVERSITY AND DISTRIBUTION. Monotypic Oriental genus related to *Mickelomyrme*; female unknown. The type species *T. fluctuata* (Smith, 1865) is distributed in Brunei, Indonesia (Morotai), Philippines (Samar, Negros, Mindanao, Tawi Tawi).

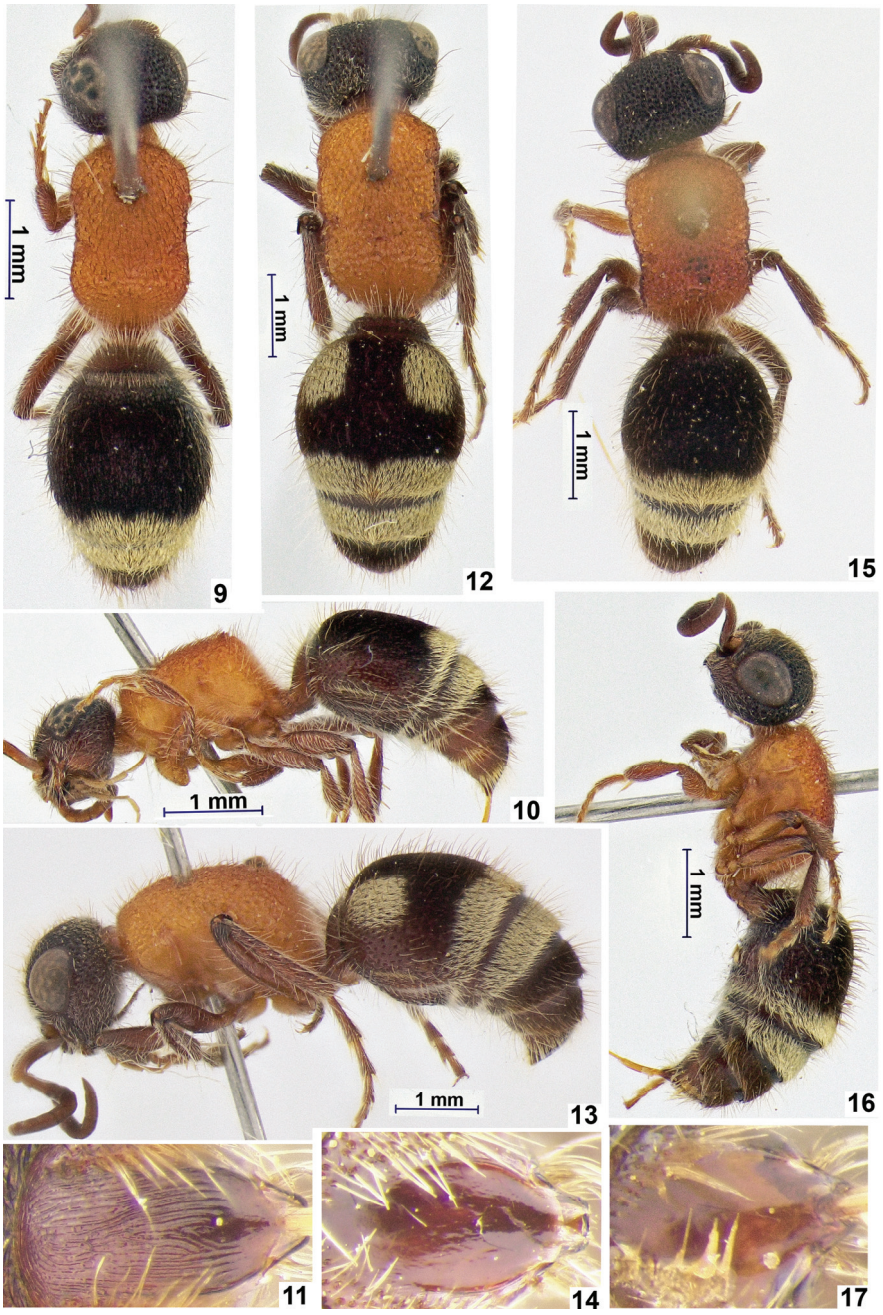
Tribe Trogaspidiini Bischoff, 1920

Genus *Krombeinidia* Lelej, 1996

DIVERSITY AND DISTRIBUTION. The genus includes 20 species and is widespread in the Oriental region (Lelej, 2005). The genus is newly recorded from Wallacea, where it is represented by two new species.

Key to females of the Wallacean species

1. T2 basally with 2 spots of yellowish setae located transversely. Pygidial area subovate, apically rounded ..... *K. mokrousovi* Lelej, **sp. n.**
– T2 basally without setal spots. Pygidial area elongate, apically triangular .... *K. wallacei* Lelej, **sp. n.**



Figs 9–17. Mutillidae. 9–11 – *Smicromyrme brothersi* **sp. n.**, ♀, holotype; 12–14 – *Krombeinidia mokrousovi* **sp. n.**, ♀, paratype; 15–17 – *K. wallacei* **sp. n.**, ♀, paratype. 9, 12, 15 – habitus, dorsal view, 10, 13, 16 – habitus, lateral view; 10, 14, 17 – pygidial area.

***Krombeinidia mokrousovi* Lelej, sp. n.**

https://zoobank.org/NomenclaturalActs/B705E0C3-CECF-4BE6-B9EF-C433B2951A94

Figs 12–14

MATERIAL EXAMINED. Holotype, ♀, **Indonesia**, Lombok, Senggigi, hotel Alang Alang, 8º28′58.6″S 116º2′12.9″E, 16.V 2012 (MM) [IBSS]. Paratype, Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2,96′E, 18.V 2012, 1♀ (MM) [IBSS].

DIAGNOSIS. FEMALE. T2 disc spots large and separated by less than spot diameter, yellowish T2 band broad and bilobed, yellowish T3 band entire, and pygidium smooth. MALE. Unknown.

DESCRIPTION. FEMALE. Body length 6.5-7.2 mm. Head black, except antennal tubercle, scape, clypeus and mandible partly reddish brown. Mesosoma and coxae ferruginous, remainder of legs blackened. Metasoma black, except T1 basally dark red and S1 ferruginous. Body setae generally sparse and silvery, except frons black and mesosomal dorsum with interspersed erect silvery and reddish setae; T2 disc, T4-5 setae densely black; and vertex, T1 apex, T2 disc lateral spots, T2 apical broadly bilobed band, T3 entire and T6 basal tuft with dense yellowish setae; T2 lateral spots diameter 1.2 × distance between spots. Head. Width behind eye 1.1 × width of pronotum. Frons, vertex and gena punctures dense to confluent. Mandible apex bidentate. Clypeus apically bidentate, lateral tooth a broad triangular lamella; basomedial portion anterad with robust tubercle. Antennal scrobe with straight lateral carina. Genal carina weak, obscured by punctures and setae. F1 1.5 × pedicel length, F2 1.25 × pedicel length. Mesosoma. Length 1.25 × width. Dorsum of mesosoma with coarse confluent punctures; weak interrupted carina separating dorsal and lateral faces of mesonotum. Side of mesosoma with dense micropunctures and short setae. Mesopleural lamella with indistinct interrupted carina. Humeral carina simple. Scutellar scale posteriorly rounded, ~3 punctures wide, surrounded by few interconnected tubercles. Posterior propodeal face reticulate, lateral and posterior propodeal faces separated by row of teeth. Metasoma. S1 with longitudinal lamella. T2 felt line 0.35 × total length of T2. T6 with long subovate pygidium, with lateral carina; smooth throughout.

DISTRIBUTION. Indonesia (Lombok).

ETYMOLOGY. I am happy to name this species for my colleague, Mikhail Mokrousov, authority in sphecoid wasps, who collected most of mutillid wasps in Lombok. Treat as noun in apposition.

REMARKS. A new species is similar to *Krombeinidia chang* Williams, 2019 from southern Thailand but differs in pronotum narrower than propodeum (as broad as propodeum in *chang*), head with only black setae (occiput, temple and lower frons with sparse yellowish setae in *chang*), reddish brown legs (black in *chang*). In the Williams *et al.* (2019) key, this species ends at couplet 34 because metasoma uniformly black and T2 apical band broadly bilobed.

***Krombeinidia wallacei* Lelej, sp. n.**

https://zoobank.org/NomenclaturalActs/47C7F018-7443-46D2-A9AE-C23A6D2AD343

Figs 15–17

MATERIAL EXAMINED. Holotype, ♀, **Indonesia**: Lombok, Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2,96′E, 18.V 2012 (MM) [IBSS]. Paratypes, Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2,96′E, 9.V 2012, 2♀ (MM); same place, 18.V 2012, 3♀ (MM) [IBSS]; W[est] Lombok, nr. Semaya, Kopi house, 29.X 1998, 1♀ (E. Eguchi) [SKYC].

DIAGNOSIS. FEMALE. T2 basally without setal spots. Pygidial area long triangular. MALE. Unknown.

DESCRIPTION. FEMALE. Body length 4.4-7.2 mm. Head black, except antennal tubercle, clypeus and mandible partly reddish brown. Mesosoma and coxae ferruginous, remainder of legs brownish. Metasoma black, except T1 basally brownish-red and S1 ferruginous. Body setae generally sparse and silvery, except frons black and mesosomal dorsum with reddish setae; T2 disc, T4 and T5 setae densely black; and T1 apex, T2 apical band, T3 entire and T6 basal tuft with dense yellowish setae. Head. Width behind eye 1.1 × width of pronotum. Frons, vertex and genal punctures dense to confluent. Mandible apex bidentate. Clypeus with preapical curved carina, ending anterad with weak lateral tubercle; basomedial portion with weak tubercle. Antennal scrobe with curved lateral carina. Genal carina weak, obscured by punctures and setae. F1 2.0 × pedicel length, F2 1.6 × pedicel length. Mesosoma. Length 1.25 × maximum width. Dorsum of mesosoma with coarse confluent punctures; weak interrupted carina separating dorsal and lateral surfaces of mesonotum. Side of mesosoma smooth with short setae. Mesopleural lamella with indistinct interrupted carina. Humeral carina simple. Scutellar scale nail-like, ~3 punctures wide, surrounded by few interconnected tubercles. Posterior propodeal face reticulate, lateral and posterior propodeal faces separated by row of teeth. Metasoma. S1 with longitudinal wave lamella. T2 felt line 0.35 × total length of T2. T6 with long triangular pygidium, with lateral carina; smooth throughout.

DISTRIBUTION. Indonesia (Lombok).

ETYMOLOGY. I am pleased to name this new species in honour of Alfred Wallace, the pioneering evolutionary biologist who collected many mutillids during his exploration of the Malay Archipelago in 1854-1862. Treat as noun in apposition.

REMARKS. I place this species in the genus *Krombeinidia* because of the apical setal band on T2 and the shape and structure of the pygidial plate, despite the absence of basal setal spots on T2.

Genus *Neotrogaspidia* Lelej, 1996

DIVERSITY AND DISTRIBUTION. The nine species of this genus are distributed in Australasian, Oriental and Palaearctic regions (Okayasu, 2023), four of them are known from Wallacea.

Key to males of the Wallacean species

Females known for *N. serafica* (T2 without spots) and *N. menadoensis* (T2 with two spots)

1. Right penis valve with inner hook-like projection, giving posteriorly bifid appearance 2
– Right penis valve incurved, without inner projection 3
2. Metasomal segments 1–3 and anterior half of segment 4 black and the remaining segments red ..... *N. haemarrhoa* (Zavattari, 1914)
– Metasomal segments 1–5 red and the remaining segments black .... *N. tricarinata* (Zavattari, 1907)
3. Metasomal segments 1–3 and usually anterior half of segment 4 red and remaining segments black. Mandibles dorsally with high carina on proximal half .... *N. serafica* (Zavattari, 1914)
– Metasomal segments 1–5 red and remaining segments black. Mandibles dorsally without high carina on proximal half ..... *N. menadoensis* (Mickel, 1935)

Neotrogaspidia haemarrhoa (Zavattari, 1914)

Mutilla haemarrhoa Zavattari, 1914: 101; ♂, holotype, ♂, Indonesia: "Coll. Gribodo, Sumbawa, D[oherty] // *Mutilla haemorrhoa* (!) Zav. E. Zavattari det. [MSNG]; Brothers 2022: 77, fig. 141, ♂.

Timulla (*Trogaspidia*) *haemarrhoa*: Mickel, 1935: 248, ♂.

Neotrogaspidia haemarrhoa: Pagliano *et al.*, 2020: 253 (*haemorrhoa*!); Brothers, 2022: 77, ♂; Okayasu, 2023: 3, ♂.

MATERIAL EXAMINED. **Indonesia**: Lombok, Mountain, 1200 m, forest, 8°27'1.8"S 116°31'54.6"E, 20.V 2012, 1♂ (MM).

DISTRIBUTION. Indonesia (Lombok*, Sumbawa).

REMARKS. My record of this species from Lombok (Lelej, 2005) was incorrect; in fact, the recorded male belongs to *N. serafica* (see below). The female of *N. haemarrhoa* is still unknown.

Neotrogaspidia menadoensis (Mickel, 1935), stat. n. et comb. n.

Timulla (*Trogaspidia*) *indagatrix menadoensis* Mickel, 1935: 238, ♂, holotype, ♂, "Celebes, Gorontalo, R. Shelford, 10-12V 1905" [OUMNH]; Brothers, 2022: 99, fig. 191, ♂.

Timulla (*Trogaspidia*) *implicata* Mickel, 1935: 238, ♀, holotype, ♀, "Celebes, Gorontalo, R. Shelford, 10-12V 1905" [OUMNH]; Brothers, 2022: 82, fig. 150, ♀. **Syn. n.**

Trogaspidia indagatrix menadoensis: Lelej, 2005: 95, ♂, Pagliano *et al*., 2020: 284; Brothers, 2022: 99.

Trogaspidia implicata: Lelej, 2005: 94, ♀, Pagliano *et al*., 2020: 283; Brothers, 2022: 82, ♀.

MATERIAL EXAMINED. **Indonesia**: Lombok, Zw. Terara u. Sikur, 310 m, NW v. Selong, offenland, 17.III 1988, 1♂ (R. Roesler) [IBSS].

DISTRIBUTION. Indonesia (Lombok*, Sulawesi).

REMARKS. According to B. Petersen's identification label attached to the female holotype of *Trogaspidia implicata* (Mickel, 1935) (Brothers, 2022), this species is the opposite sex and a subjective synonym of *N. menadoensis* (Mickel, 1935).

***Neotrogaspidia serafica* (Zavattari, 1914)**
Figs 18–19

Mutilla serafica Zavattari, 1914: 77, ♀, lectotype (designated by Mickel 1935), ♀, Indonesia: coll. Gribodo, Tambora, Sumbawa, D[oherty] // *Mutilla serafica* Zav. E. Zavattari det. [MSNG]; Brothers, 2022: 145, fig. 281, ♀.
Timulla (*Trogaspidia*) *serafica*: Mickel, 1935: 251, ♀.
Neotrogaspidia serafica: Lelej, 2005: 80, ♀; Pagliano *et al.*, 2020: 253; Brothers, 2022: 145, ♀; Okayasu, 2023: 3, ♀.
Neotrogaspidia haemarrhoa: Lelej, 2005: 79, ♂ (Lombok).

MATERIAL EXAMINED. **Indonesia**: Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2′57.8″E, 9.V 2012, 2♀, 11♂ (1♀ and 1♂ *in copula*) (MM); same place, 18.V 2012, 7♂ (MM); same place, 21.V 2012, 2♀, 2♂ (MM); same place, 22.V 2012, 2♀, 4♂ (probably 1♀ and 1♂ *in copula*) (MM); Senggigi, hotel Alang Alang, 8º28′58.6″S 116º2′12.9″E, 16.V 2012, 1♀ (MM); same place, 19.V 2012, 1♂ (MM); Lombok, Kokok Putih River, 8º15′19.3″S 116º28′38.5″E, 20.V 2012, 1♀ (MM); Lombok, Tetebatu, 25.X.1998, 2♀, K, Eguchi [SKYC]; Lombok, Suranadi, Mataram, 16.III.1987, 1♂ (T. Inoue) [SKYC]; Lombok, Batukok, Bayan, 450 m, 13.III 1987, 1♂ (T. Inoue) [SKYC].

Figs 18–21. Male genitalia of Mutillidae. 18–19 – *Neotrogaspidia serafica*; 20–21 – *Promecidia lombok* **sp. n.** (20 – paratype, 21 – holotype). 18, 20 – dorsal view, 19, 21 – ventral view.

MALE (hitherto unknown). Body length 11.2–17.6 mm. Mandibles robust, bidentate, with distinct tooth at the base beneath, dorsally with high curved carina on proximal half. Clypeus concave, smooth, with high subbasal medial carina and preapical curved carina with setae. Metasomal segments 1–3 and usually anterior half of segment 4 red and the remaining segments black. Right penis valve incurved, without inner projection. Genitalia as in Figs 18–19.

DISTRIBUTION. Indonesia (Ambon, Lombok, Solor, Sumbawa).

REMARKS. It is possible that the male of *N. serafica* was described as *Trogaspidia boniensis* (Mickel, 1935) from Sulawesi. In this case the latter became a junior subjective synonym.

Neotrogaspidia tricarinata (Zavattari, 1907)

Mutilla tricarinata Zavattari, 1907: 1, ♂, holotype, ♂, "Mutilla tricarinata Zav." [Zavattari's handwriting]; "Trogaspidia tricarinata tricarinata (Zav.) B.Petersen det. [typeset] 1978 [Petersen's handwriting]"; "Holotype [typeset] tricarinata [Petersen's handwriting]" [MRSN]; Brothers, 2022: 156, fig. 305, ♂.
Trogaspidia tricarinata: Lelej, 2005: 104, ♂; Pagliano *et al*., 2020: 292.
Neotrogaspidia tricarinata: Brothers, 2022: 156, ♂; Okayasu, 2023: 4, ♂.

MATERIAL EXAMINED. Two males [ZIN] with wrong labels "Владивосток", "Проф[ессор] Таренецкий" [=Vladivostok, "Professor Tarenetsky"] have been identified by late B. Petersen in 1982 as *Trogaspidia tricarinata* (Zavattari, 1907).

DISTRIBUTION**.** Indonesia (Aru or Kei).

REMARKS. According to B. Petersen, the type locality of this species should be Kepulauan Aru (06°09'S, 134°30'E) or Kepulauan Kei (05°45'S, 132°43'E), Maluku, Indonesia (Brothers, 2022).

Genus *Petersenidia* Lelej in Lelej et Yamane, 1992

DIVERSITY AND DISTRIBUTION. Lelej (2005) listed 19 species belonging to *Petersenidia* and 22 species doubtfully placed in the genus. *Petersenidia* is widespread in the Oriental region; four species are known from Wallacea:
Petersenidia boopis (Kohl, 1883); Indonesia (Sulawesi).
Petersenidia dohertyi (Zavattari, 1914); Indonesia (Sumbawa).
Petersenidia mikhailovi Lelej, 2021; Indonesia (Sulawesi).
Petersenidia macassarica (Zavattari, 1914); Indonesia (Sulawesi).

Genus *Promecidia* Lelej, 1996

DIVERSITY AND DISTRIBUTION. Eleven species are recognized in the eastern Oriental Region (Lelej *et al*., 2016); one of which are known from Wallacea and another one is new.

***Promecidia thoracica* (Smith, 1860), comb. n.**

Mutilla thoracica Smith, 1860a: 76; ♂, holotype, "Mak[assar]" [OUMNH]; Brothers, 2022: 153, ♂, fig. 300.
Timulla (*Trogaspidia*) *thoracica*: Mickel, 1935: 255, ♂.
Petersenidia thoracica: Lelej, 2005: 73, ♂.
Mutilla bonthainensis André, 1896b: 14; ♂, holotype, ♂, "S[outhern].Celebes / Bonthain / C.Ribbe 1884" [HNHM], examined; Brothers, 2022: 35, fig. 36, ♂. **Syn. n.**
Timulla (*Trogaspidia*) *bonthainensis*: Mickel, 1935: 257, ♂.
Promecidia bonthainensis: Lelej, 2005: 81, ♂; Brothers, 2022: 35, ♂.

MATERIAL EXAMINED. The holotype of *Mutilla bonthainensis* André, 1896.

DISTRIBUTION. Indonesia (Sulawesi).

REMARKS. According to B. Petersen's identification label attached in 1981 to the male holotype of *Mutilla bonthainensis* André, 1896, this species is a junior subjective synonym of *M. thoracica* Smith, 1860. The former is currently placed in the genus *Promecidia* and I replace *thoracica* in this genus as well.

***Promecidia lombok* Lelej, sp. n.**

https://zoobank.org/NomenclaturalActs/1A814622-58C4-4FD8-8D85-0E4570D20441

Figs 20–21

MATERIAL EXAMINED. Holotype, ♂, **Indonesia**: Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2,96′E, 21.V 2012 (MM) [IBSS]. Paratypes: same place, 9, 18.V 2012, 3♂ (MM) [IBSS].

DIAGNOSIS. MALE. Scape beneath with two carinae, space between them shiny, without setae. Clypeus without preapical transverse carina. S2 with weak medial carina not highest basally. FEMALE. Unknown.

DESCRIPTION. MALE. Body length 8.0–8.8 mm. Black except ferruginous T1-3 and S1-3; tegula reddish brown. Frons, vertex, lateral area of clypeus and base of mandible with dense whitish subpressed setae; gena with dense whitish erect setae. Pronotum with whitish setae, posterior margin of pronotum densely fringed; mesonotum with sparse reddish setae. Mesopleuron, lateral area of metanotum and dorsum of propodeum with whitish dense suberect setae; posterior face of propodeum with whitish sparse erect setae; scutellum and metanotum medially with whitish erect setae; legs with whitish dense suberect setae; T1-3 with sparse whitish setae; T3-5 with long erect and suberect shorter whitish setae. T1-6 sparsely fringed apically; S1-5 with sparse suberect whitish setae; T2 with long lateral felt line, S2 without lateral felt line. Mandible bipartite apically, with subbasal tooth on outer margin below and dorsal carina extending from base to subapical tooth; inner margin weakly widened subbasally. Clypeus subtriangularly raised basally, with central area shiny concave and with anterior margin slightly raised, without transverse preapical carina. Scape below with two carinae, space between them shiny, without setae. F1 equal F2; antennal scape carinate above, lateral carina curved. Ocelli small, POL:OOL=0.6–0.65. Frons, vertex and gena with coarse dense punctures. Tegula not

protruding beyond scuto-scutellar suture, with smooth and shiny disc and posterior margin. Mesoscutellum evenly convex. Metanotum densely punctured, pronotum and mesopleuron with dense, confluent punctures; mesoscutum with dense, separated punctures; scutellum with larger, coarse, somewhat confluent punctures; propleuron, mesopleuron anterad, metapleuron glabrous. Propodeum reticulate, with larger cells dorsomedially. Notauli and parapsids well developed. Forewing fuscous. Pterostigma length equal to distance between origin of RS1 on SC and pterostigma. S2 with weak medial carina not highest basally. S8 (hypopygium) with separate punctures. T7 with coarse, dense punctures; medially with narrow glabrous area. Genitalia as in Figs 20–21.

DISTRIBUTION. Indonesia (Lombok).

ETYMOLOGY. The specific name originates from Lombok, name of the island where the species was collected.

REMARKS. The species is related to *Promecidia chui* Lelej et Xu, 2016, in the key of Lelej *et al*. (2016), where it ends at couplet 3, but differs as follows:

3. F1 approximately equal to F2; scape widened apically 3a
– F1 1.4 times F2; scape not apically widened. China (Hainan, Guangdong) .... *P. abnormis* Lelej, 2016
3a. Scape beneath with two carinae, space between them shiny, without setae. Clypeus without preapical transverse carina. S2 with weak medial carina not highest basally. Tegula and legs reddish brown. Indonesia (Lombok) ..... *P. lombok* Lelej, **sp. n.**
– Scape beneath with one carina. Clypeus with distinct preapical transverse carina. S2 with median carina highest basally. Tegula ferruginous, legs ferruginous red. China (Yunnan, Hainan) ..... *P. chui* Lelej et Xu, 2016

Genus *Protrogaspidia* Lelej, 1996

DIVERSITY AND DISTRIBUTION. Two species are recognized in the Oriental Region (Lelej, 2005); both are from Wallacea:

Protrogaspidia volatilis (Smith, 1858); Indonesia (Sulawesi).

Protrogaspidia neglecta (Smith, 1860), comb. n.

Mutilla neglecta Smith, 1860a: 76; ♂, holotype, "Mak[assar]" (Sulawesi, 05°07′S, 119°24′E) [OUMNH]; Brothers, 2022: 107, fig. 206, ♂.
Mutilla celebensis André, 1905: 215; ♂, ♀, lectotype (designated by Brothers, 2022), ♂, "S[üd].Celebes / Bua-Kraeng / 5000' Febr.1896 / H.Fruhstorfer" [HNHM], examined; paralectotype (designated by Brothers, 2022), ♀, with the same label [HNHM], examined: Brothers, 2022: 42, fig. 67a, ♂, 67b, ♀. **Syn. n.**
Timulla (*Trogaspidia*) *neglecta*: Mickel, 1935: 265, ♂.
Timulla (*Trogaspidia*) *celebensis*: Mickel, 1935: 266, ♂, ♀.
Petersenidia neglecta: Lelej, 2005: 71, ♂; Brothers, 2022: 107, ♂.
Protrogaspidia celebensis: Lelej, 2005: 81, ♂, ♀; Brothers, 2022: 42, ♂, ♀.

MATERIAL EXAMINED. The lectotype (♂) and paralectotype (♀) of *Mutilla celebensis* André, 1905, which deposited in HNHM.

DISTRIBUTION. Indonesia (Sulawesi).

REMARKS. According to B. Petersen's identification label attached to the male lectotype of *Mutilla celebensis* André, 1905 in 1981 (Brothers, 2022), this species is a junior subjective synonym of *M. neglecta* Smith, 1860. The same label is attached to the female paralectotype of *M. celebensis* André, 1905.

Genus *Trogaspidia* Ashmead, 1899

DIVERSITY AND DISTRIBUTION. Over 350 species are currently placed in the genus *Trogaspidia*, including over 200 Afrotropical species in various subgenera (Bischoff 1920, Nonveiller 1995) and 140 Oriental species (Lelej 2005).

Thirteen species are known from Wallacea, but after revision they may be replaced by other genera of the tribe Trogaspidiini. *Trogaspidia menadoensis* has already been transferred to the genus *Neotrogaspidia* in this paper. It is possible that the unknown male of *N. serafica* described above is known as *T. boniensis*. Three subspecies have been elevated to full taxonomic status, as was proposed for Mickel's subspecies (Williams *et al*., 2019).

Trogaspidia albertisi (André, 1896); Indonesia (Kepalauan Aru, Misool, New Guinea, Run, Salawati, Seram, Waigeo), Papua New Guinea.

Trogaspidia anthylla (Smith, 1860); Indonesia (Ambon, Bacan, Halmahera, Seram).

Trogaspidia boniensis (Mickel, 1935); Indonesia (Sulawesi).

Trogaspidia doricha (Smith, 1860); Indonesia (Ambon, Bacan, New Guinea, Seram), Papua New Guinea.

Trogaspidia exilis (Smith, 1859); Indonesia (Ambon, Kai).

Trogaspidia fervida (Smith, 1860); Indonesia (Sulawesi).

Trogaspidia ianthea (Smith, 1860); Indonesia (Bacan, Halmahera, Ternate).

Trogaspidia rubiginosa (André, 1896), **stat. n.**; Indonesia (Ambon, Seram).

Trogaspidia indagatrix (Mickel, 1935); Indonesia (Ambon).

Trogaspidia oceanica (André, 1896); Indonesia (Biak, New Guinea, Yapen), Papua New Guinea.

Trogaspidia oceanitis (Mickel, 1935); Indonesia (Ambon, Sulawesi).

Trogaspidia pentheus (Smith, 1860); Indonesia (Bacan, New Guinea).

Trogaspidia melanesia (Mickel, 1935), **stat. n.**; Indonesia (Ambon).

Genus *Wallacidia* Lelej et Brothers, 2008

DIVERSITY AND DISTRIBUTION. The genus includes 22 Oriental species, eight of them are known from Wallacea. One species is recorded from Lombok.

Wallacidia laratensis (Mickel, 1935); Indonesia (Larat).

Wallacidia merops (Smith, 1860); Indonesia (Bacan, Gebe, Halmahera, Morotai, Ternate).

Wallacidia paloeana (Pagden, 1949); Indonesia (Sulawesi).

Wallacidia philippinensis (Smith, 1855); Indonesia (Ambon, Solor, Sulawesi); Philippines.

Wallacidia sumbana (Pagden, 1949); Indonesia (Sumba);
Wallacidia timorensis (O'Toole, 1975); Indonesia (Timor) or Timor-Leste.
Wallacidia vicina (Sichel et Radoszkowski, 1869); Indonesia (Ambon, New Guinea, Seram, Yule).

Wallacidia rosemariae (O'Toole, 1975)

Timulla oculata rosemariae O'Toole, 1975: 240; ♂, ♀; holotype, ♂, Indonesia, Lombok, Sampit, 660 m, May-June 1896, Fruhstorfer [ZMHB]; Brothers, 2022: 134, figs 257a, 257b, ♂, ♀.
Radoszkowskius rosemariae: Lelej, 2005: 85.
Wallacidia rosemariae: Pagliano *et al.*, 2020: 295; Brothers, 2022: 134, ♂, ♀.

MATERIAL EXAMINED. **Indonesia**: Lombok, near Senggigi, 450 m, forest, 8º28′31.9″S 116º2′57.8″E, 9.V 2012, 1♀, 1♂ (MM); same place, 18.V 2012, 1♂ (MM); same place, 22.V 2012, 1♂ (MM).

DISTRIBUTION. Indonesia (Flores, Lombok, Sumbawa).

DISCUSSION

The mutillid fauna of Wallacea (58 species in 18 genera) is highly endemic (Table 1). The distribution of one genus (*Protrogaspidia*) and 43 species of other genera is restricted to this region. The Australian genera *Ascetotilla*, *Ephutomorpha* and *Eurymutilla* occur in Wallacea with one to three species. Other mutillid genera of Wallacea are common in another part of the Oriental region, and *Odontomutilla* and *Trogaspidia* invade the Australian region with a few species.

All females of the Wallacean mutillids (39 species) belong to the Black Head Color Syndrome (BHCS) group. Among them there are several occurrences of black T2 without setal spots (striped and apical) in different clades, perhaps indicating secondary loss of spots: *Odontomutilla manifesta*, *O. simplicifascia*, and *Yamanetilla yamanei* (Odontomutillinae); *Smicromyrme brothersi* (Mutillinae: Smicromyrmini), *Krombeinidia wallacei*, *Neotrogaspidia serafica*, *Trogaspidia pentheus*, and *Wallacidia merops* (Mutillinae: Trogaspidiini). In other parts of the Oriental realm, such T2 markings occur in species with BHCS (11 species in eight genera) as well as with Red Head Color Syndrome (nine species in seven genera) (Boutin, 2024). Boutin and Vilhelmsem (2024) suggested that the type of metasomal markings is more phylogenetically constrained in the Oriental fauna. This variability could be an indicator of smaller mimicry rings. Lopez *et al.* (2021) found that darker species occur in environments with more rainfall, more UV-B and in forested areas. In the Wallacean mutillids, such coloration may be cryptic rather than aposematic.

ACKNOWLEDGEMENTS

I am deeply grateful to the curators and collection managers who helped me to study the material during a scientific trips in 2010-2011, especially S. Csősz (HNHM), D. Zimmermann (NHMW), F. Koch (ZMHB).

The research was carried out within the state assignment of Ministry of Science and Higher Education of the Russian Federation (theme No. 121031000151–3).

Table 1. Diversity and distribution of the genera of Mutillidae in Wallacea and its biogeographical subregion

Genera	Number of species			
	Wallacea Total/ endemic	**Sulawesi**	**Lesser Sunda/ Lombok**	**Maluku**
Sphaeropthalminae: Dasymutillini				
Ascetotilla Brothers, 1971	1/0	0	0	1
Ephutomorpha André, 1902	1/1	0	0	1
Eurymutilla Ashmead, 1899	3/2	0	1/0	2
Myrmillinae				
Bischoffitilla Lelej, 2002	4/1	3	1/1	0
Odontomutillinae				
Odontomutilla Ashmead, 1899	6/4	2	0	4
**Yamanetilla* Lelej, 1996	1/1	1	0	0
Mutillinae: Smicromyrmini				
Andreimyrme Lelej, 1995	1/1	1	0	0
Mickelomyrme Lelej, 1995	2/0	1	1*/1*	1
Nordeniella Lelej, 2005	1/1	0	1/1	0
Smicromyrme Thomson, 1870	2/1	1	1/1	0
Tsunekimyrme Lelej, 1995	1/0	0	0	1
Mutillinae: Trogaspidiini				
**Krombeinidia* Lelej, 1996	2/2	0	2/2	0
Neotrogaspidia Lelej, 1996	4/4	1	3/3	2
Petersenidia Lelej, 1992	4/4	3	1/0	0
Promecidia Lelej, 1996	2/2	1	1/1	0
Protrogaspidia Lelej, 1996	2/2	2	0	0
Trogaspidia Ashmead, 1899	13/10	3	0	10
Wallacidia Lelej et Brothers, 2008	8/7	2	2/1	4
Total species	**58/43**	**21**	**14/11**	**26**

Remark. The new records are asterisked (*).

REFERENCES

André, E. 1896a. Étude sur les Mutillides existant dans les collections du Musée Civique de Gênes. *Annali del Museo Civico di Storia Naturale di Genova*, 37: 66–104.

André, E. 1896b. Mutillides nouveaux ou imparfaitement connus faisant partie des collections du Musée National de Hongrie. *Természetrajzi Füzetek*, 19: 9–25.

André, E. 1902. Hymenoptera. Fam. Mutillidae. *In*: Wytsman, P. *Genera Insectorum*. Fasc. 11. Bruxelles, pp. 1–77, pls. 1–3.

André, E. 1905. Mutillides nouveaux ou peu connus de l'Ancien Monde et de l'Australie. (Hym). *Zeitschrift für Systematische Hymenopterologie und Dipterologie*, 5(4–5): 201–216 + 265–277.

Bischoff, H. 1920–1921. Monographie der Mutilliden Afrikas. *Archiv für Naturgeschichte*, 86A(1–3): 1–480 (1920); 86A(4–5): 481–830 (1921).

Boutin, M. 2024. data from: Colour pattern diversity and evolution in Oriental velvet ants (Hymenoptera: Aculeata: Mutillidae) [Data set]. *Zenodo*. DOI: 10.5281/zenodo.10853048

Boutin, M. & Vilhelmsen, L. 2024. Colour pattern diversity and evolution in Oriental velvet ants (Hymenoptera: Aculeata: Mutillidae). *Biological Journal of the Linnean Society*: 1–16. DOI: 10.1093/biolinnean/blae064

Brothers, D.J. 1971. *Ascetotilla*, a new genus of Mutillidae from New Guinea (Hymenoptera). *Pacific Insects*, 13(3–4): 471–485.

Brothers, D.J. 2022. Critical analysis of the type material of Mutillidae described from the Australasian Region (Hymenoptera). *Zootaxa*, 5140(1): 1–215. DOI: 10.11646/zootaxa.5140.1.1

Brothers, D.J. & Lelej, A.S. 2017. Phylogeny and higher classification of Mutillidae (Hymenoptera) based on morphological reanalyses. *Journal of Hymenoptera Research* 60: 1–97. DOI: 10.3897/jhr.60.20091

Coates, B.J. & Bishop, K.D. 1997. *A guide to the birds of Wallacea: Sulawesi, the Moluccas and Lesser Sundas Islands, Indonesia*. Dove Publications, Alderley, Queensland, 535 p. + 64 pls.

Conservation International. 2014. *Ecosystem Profile Summary: Wallacea Biodiversity Hotspot.* Critical Ecosystem Partnership Fund, i-xxii+353 p. available: https://www.cepf.net/sites/default/files/final.sundaland.sumatra.ep_0.pdf

Lelej A.S. 2020a. To the knowledge of velvet ants of the genera *Artiotilla* Invrea, *Radoszkowskitilla* Lelej and *Taiwanomyrme* Tsuneki (Hymenoptera: Mutillidae). *Far Eastern Entomologist*, 410: 1–10. DOI: 10.25221/fee.410.1

Lelej A.S. 2020b. Three new species of velvet ants from the tribe Sicromyrmini (Hymenoptera: Mutillidae) with unusual color syndrome. *Far Eastern Entomologist*, 421: 1–9. DOI: 10.25221/fee.421.1

Lelej A.S. 2021a. Discovery of the genus *Odontomyrme* Lelej, 1983 (Hymenoptera: Mutillidae) in New Guinea and description of *O. rasnitsyni* sp. n. *Far Eastern Entomologist*, 437: 1–5. DOI: 10.25221/fee.437.1

Lelej A.S. 2021b. A new species of the genus *Petersenidia* Lelej (Hymenoptera: Mutillidae) from Indonesia, eastward of Wallace's line. *Zootaxa*, 5006(1): 101–105. DOI: 10.11646/zootaxa.5006.1.13

Lelej A.S. 2023a. Discovery of the genus *Odontomutilla* Ashmead, 1899 (Hymenoptera: Mutillidae) in Myanmar with description of a new species. *Far Eastern Entomologist*, 476, 1–7. DOI: 10.25221/fee.476.1

Lelej A.S. 2023b. Review of the tribe Ctenotillini (Hymenoptera: Mutillidae) from Oriental and Palaearctic Regions. *Far Eastern Entomologist*, 480: 1–22. DOI: 10.25221/ fee.480.1

Lelej, A.S. 2005. Catalogue of the Mutillidae (Hymenoptera) of the Oriental Region. Dalnauka, Vladivostok. 252 p.

Lelej, A.S. & Williams K.A. 2023. Review of the tribe Smicromyrmini Bischoff, 1920 (Hymenoptera: Mutillidae). *Zootaxa*, 5231(2): 101–140. DOI: 10.11646/zootaxa.5231.2.1

Lelej, A.S., Zhou, H.-t., Loktionov, V.M. & Xu, Z.-f. 2016. Review of the genus *Promecidia* Lelej, 1996, with description of two new species from China (Hymenoptera, Mutillidae, Trogaspidiini). *ZooKeys*, 641: 103–120. DOI: 10.3897/zookeys.641.10765

Lopez, V.M., Azevedo Tosta T.A., da Silva, G.G., Bartholomay, P.R., Williams, K.A. & Ferreira, G.-F. 2021. Color lightness of velvet ants (Hymenoptera: Mutillidae) follows an environmental gradient. *Journal of Thermal Biology*, 100: 103030. DOI: 10.1016/j.jtherbio.2021.103030

Michaux, B. 2010. Biogeology of Wallacea: Geotectonic models, areas of endemism, and natural biogeographical units. *Biological Journal of the Linnean Society*, 101(1): 193–212. DOI: 10.1111/j.1095-8312.2010.01473.x.

Mickel, C.E. 1934. Mutillidae of the Philippine Islands (Hymenoptera). *The Philippine Journal of Science*, 54(1): 91−219, pl. 1.
Mickel, C.E. 1935. The mutillid wasps of the islands of the Pacific Ocean (Hymenoptera: Mutillidae). *Transactions of the Royal Entomological Society of London*, 83(2): 177–312. DOI: 10.1111/j.1365-2311.1935.tb01207.x
Ngakan, P.O., Nasri, N., & Putra, P.S. 2023. The value of Wallacea region: considerations behind the changing scope of JPK Wallacea. *Jurnal Penelitian Kehutanan Wallacea*, 11(2): 1–7. DOI: 10.24259/jpkwallacea.v12i1.26952
Nonveiller, G. 1995. A preliminary approach to a revision of the Afrotropical representatives of the genus *Trogaspidia* Ashmead, 1899 (sensu Bischoff, 1920) (Hymenoptera, Mutillidae). Studies on African Mutillidae XXI. (Third contribution to the knowledge of the afrotropical *Trogaspidia*). *Annales de la Societé Entomologique de France, New Series*, 31(4): 349–368. DOI: 10.1080/21686351.1995.12277734
Okayasu, J. 2020. Velvet ants of the tribe Smicromyrmini Bischoff (Hymenoptera: Mutillidae) of Japan. *Zootaxa*, 4723(1): 1–110. DOI: 10.11646/zootaxa.4723.1.1
Okayasu, J. 2022 Remarkable range extension of the genus *Nordeniella* Lelej, 2005 (Hymenoptera: Mutillidae: Smicromyrmini): Description of a new species from Sumbawa, Indonesia. *Journal of Insect Biodiversity*, 32(2): 56–63. DOI: 10.12976/jib/2022.32.2.3
Okayasu, J. 2023. Love is in the air and beyond the ocean: Taxonomic review of *Neutrogaspidia* Lelej Lelej (Hymenoptera: Mutillidae: Trogaspidiini) in Northeast Asia highlights its unique distributional pattern. *Entomological Science*, 26: e12532. DOI: 10.1111/ens.12532
Okayasu, J., Williams, K.A., Lelej, A.S. & Pham, Th.H. 2021. Review of female *Andreimyrme* Lelej (Hymenoptera: Mutillidae: Smicromyrmini). Zootaxa, 5061(1): 1–38. DOI: 10.11646/zootaxa.5061.1.1
O'Toole, Ch. 1975. The Systematics of *Timulla oculata* (Fabricius) (Hymenoptera, Mutillidae). *Zoologica Scripta*, 4(5–6): 229–251. DOI: 10.1111/j.1463-6409.1975.tb00733.x
Pagliano, G., Brothers, D.J., Cambra, R., Lelej, A.S., Lo Cascio, P., Matteini Palmerini, M., Scaramozzino, P.L., Williams, K.A. & Romano, M. 2020[2018]. Checklist of names in Mutillidae (Hymenoptera), with illustrations of selected species. *Bollettino del Museo Regionale di Scienze Naturali di Torino*, 36(1–2): 5–427.
Smith, F. 1859. Catalogue of hymenopterous insects collected by Mr. A.R. Wallace at the islands of Aru and Key. *Journal of the Proceedings of the Linnean Society of London, Zoology*, 3: 132–179. DOI: 10.1111/j.1096-3642.1859.tb00077.x
Smith, F. 1860a. Descriptions of new species of hymenopterous insects collected by Mr. A.R. Wallace at Celebes. *Journal of the Proceedings of the Linnean Society of London, Zoology*, 5: 57–93. DOI: 10.1111/j.1096-3642.1860.tb01021.x
Smith, F. 1860b. Catalogue of hymenopterous insects collected by Mr. A.R. Wallace in the islands of Bachian, Kaisaa, Amboyna, Gilolo, and at Dory in New Guinea. *Journal of the Proceedings of the Linnean Society of London, Zoology*, 5: 93–143, pl. I. DOI: 10.1111/j.1096-3642.1860.tb01022.x
Smith, F. 1863. Catalogue of hymenopterous insects collected by Mr. A.R. Wallace in the islands of Mysol, Ceram, Waigiou, Bouru, and Timor. *Journal of the Proceedings of the Linnean Society of London, Zoology*, 7: 6–48. DOI: 10.1111/j.1096-3642.1863.tb02085.x
Sutanto, D.D., Williams, K.A., Nugroho, H. & Lelej, A.S. 2021. To the knowledge of the velvet ant genus *Bischoffitilla* Lelej (Hymenoptera: Mutillidae) in Indonesia. *Treubia*, 48(1): 1–12. DOI: 10.14203/treubia.v48i1.4011
Tsuneki, K., Nozaka, C., Tano, T., Kurokawa H. & Murota, T. 1993. Mutillidae recently collected in the Philippines (Hymenoptera). *Special Publications of the Japan Hymenopterists Association*, 41: 1–38.

Waldren, G.C., Sadler, E.A., Murray, E.A., Bossert, S., Danforth, B.N. & Pitts, J.P. 2023. Phylogenomic inference of the higher classification of velvet ants (Hymenoptera: Mutillidae). *Systematic Entomology*, 1–25. DOI: 10.1111/syen.12588.

Williams, K.A., Lelej, A.S., Okayasu, J., Borkent, C.J., Malee, R., Thoawan, K. & Thaochan, N. 2019. The female velvet ants (aka modkhong) of southern Thailand (Hymenoptera: Mutillidae), with a key to the genera of southeast Asia. *Zootaxa*, 4602: 1–69. DOI: 10.11646/zootaxa.4602.1.1

Zavattari, E. 1907. Nuovo o poco note Mutille dell'Australia. *Bollettino dei Musei di Zoologia ed Anatomia Comparata della R. Università di Torino*, 22(565): 1–4.

Zavattari, E. 1914. Mutille Austro-Malesi. *Bolletino della Società Entomologica Italiana*, 45: 61–114.