



A checklist of Nomiinae (Hymenoptera, Halictidae) from Kerala, India: new distributional and floral association records

Cherodath Sankar Athul

Shadpada Entomology Research Lab, Department of Zoology, Christ College (Autonomous), Irinjalakuda, 680125, Kerala, India. Affiliated with the University of Calicut, Kerala, India.

✉ athulsankar24@gmail.com

<https://orcid.org/0009-0008-8415-0298>

Azhakath Viswambharan Vishnu

Shadpada Entomology Research Lab, Department of Zoology, Christ College (Autonomous), Irinjalakuda, 680125, Kerala, India. Affiliated with the University of Calicut, Kerala, India.

✉ vishnuvishwam1999@gmail.com

<https://orcid.org/0009-0005-2822-860X>

Anju Sara Prakash

Shadpada Entomology Research Lab, Department of Zoology, Christ College (Autonomous), Irinjalakuda, 680125, Kerala, India. Affiliated with the University of Calicut, Kerala, India.

✉ anjusara2025@gmail.com

<https://orcid.org/0000-0001-6759-7508>

Chenthamarakshan Bijoy

Shadpada Entomology Research Lab, Department of Zoology, Christ College (Autonomous), Irinjalakuda, 680125, Kerala, India. Affiliated with the University of Calicut, Kerala, India.

✉ bijoyc@christcollegeijk.edu.in

<https://orcid.org/0000-0002-5016-0454>

Edappilly Mathew Shaji

Department of Zoology, K.K.T.M Govt. College, Pullut, Thrissur, 680663. Affiliated with the University of Calicut, Kerala, India.

✉ shajiem007@gmail.com

<https://orcid.org/0000-0002-5662-7262>

ABSTRACT. This study reports nine species of Nomiinae bees (Hymenoptera: Halictidae) for the first time from Kerala, India: *Austronomia capitata* (Smith, 1875), *A. goniognatha* (Cockerell, 1919), *A. ustula* (Cockerell, 1911), *Gnathonomia argenteobalteata* (Cameron, 1902), *Hoplonomia incerta* (Gribodo, 1894), *Lipotriches torrida* (Smith, 1879), *L. exagens* (Walker, 1860), *Lipotriches minutula* (Friese, 1909), and *L. pulchriiventris* (Cameron, 1897). *Lipotriches torrida*, a rarely collected species, is documented outside its type locality for the first time. Another uncommon species, *G. argenteobalteata*, last recorded in 1902 from an unspecified location in India, has been rediscovered in the present study. A comprehensive checklist of 42 Nomiinae species from Kerala is provided, incorporating new distributional records and floral associations based on original records and literature review. Brief diagnoses for all collected species are also presented.

Keywords: diagnosis, Oriental, pollinators, rediscovery, solitary bees

Received:
February 25, 2025

Accepted:
April 21, 2025

Published:
July 22, 2025

Subject Editor:
Ali Asghar Talebi

Citation: Athul, C.S., Vishnu, A.V., Prakash, A.S., Bijoy, C. & Shaji, E.M. (2025) A checklist of Nomiinae (Hymenoptera, Halictidae) from Kerala, India: new distributional and floral association records. *Journal of Insect Biodiversity and Systematics*, 11 (3), 601–623.

INTRODUCTION

Kerala, an Indian state, located on the southwestern coast of peninsular India, is bordered by the Western Ghats to the east and coastal plains to the west. This unique topology supports a variety of ecosystems, including forests, marshes, mangroves, ponds, seashores, and deltas in the state (Sreedharan, 2004). The Western Ghats, a recognized biodiversity hotspot, harbours a significant portion of Kerala's rich flora and fauna. Despite its small geographical area of 38,863 km² (e.g., 1.2 % of India's geographical area), Kerala is home to 11.30% of the total bee fauna reported from India (Prakash et al., 2020). The

Corresponding author: Chenthamarakshan Bijoy, ✉ bijoyc@christcollegeijk.edu.in

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subfamily Nomiinae represents a major group of solitary bees with near-global distribution but is absent in South America (Michener, 2007; Astafurova & Proshchalykin, 2019) and includes 626 species globally (Ascher & Pickering, 2025), with 136 species in the oriental region (Pauly, 2009) and 83 species in India (Majumder et al., 2024). The first comprehensive study on Indian Bees by Bingham (1897) reported 287 species, including 26 species of Nomiinae (Hymenoptera, Halictidae). However, no specific information was provided regarding their distribution in southern India. Later, Saini and Rathor (2012) compiled a list of Halictidae including 72 species of Nomiinae from India, of which only 17 species were reported from southern India. Despite limited studies by Indian scientists, Pauly (2009, 2014) revised the classification of Nomiinae from the Oriental region, New Guinea, and Islands of the Pacific Ocean. His work elevated several subgenera proposed by Michener (2007) to generic rank and provided identification keys to many species in this region.

Online databases based on museum records, such as Atlas Hymenoptera (Pauly, 2025), Discover Life's Bee Species Guide and the world checklist (Ascher & Pickering, 2025) have further improved our understanding of Nomiinae species distributed in Kerala, India. The first comprehensive original work on South Indian Nomiinae bees, based on field collection was conducted by Pannure and Belavadi (2017), who documented 48 species under 13 genera. Subsequent studies by Manjusha and Jobiraj (2017, 2018, 2023) contributed additional records to Kerala's Nomiinae fauna. In the present study, nine species of Nomiinae bees are recorded for the first time from Kerala. Among these, two species represent rediscoveries, one of which is also documented for the first time outside its type locality. This study expands our knowledge of Nomiinae diversity in Kerala and highlights the need for further field-based explorations.

MATERIAL AND METHODS

Field surveys were conducted in different habitats, including Kole wetlands, Riverside and Hillock to update the checklist of Nomiinae bees of Kerala, India (Fig. 1). Specimens were collected using a sweep net and transferred to a killing jar containing ethyl acetate. The collected specimens were then stretched, pinned, and dried for further studies. Each specimen was labelled with the date of collection and the host plant from which it was collected and kept in insect storage boxes. Detailed morphological examination of specimens was conducted using high-resolution stereo zoom microscopes, Labomed® iVu 5100, and Luxeo® 6Z for taxonomic studies. Photographs were taken using an Olympus® Tough TG-6 Digital Camera with a custom-made diffuser, and photographic plates were prepared using Adobe® Photoshop 2020. In addition to examining collected specimens, all available literature on Indian Nomiinae bees was reviewed for the recorded species and to understand the distribution status of the species. Species identification was based on Pauly (2009, 2014). Plant species identified by Dr R. Soumya (Department of Botany, Christ College Autonomous, Irinjalakuda) using the photographs taken during the field surveys. Bees exhibiting resource interactions with flowers for either nectar, pollen or both are recorded through direct observations during repeated surveys and are considered florally associated plant species for this study. All collected specimens were deposited at Shadpada Entomology Research Lab (SERL) at Christ College (Autonomous), Irinjalakuda, Thrissur, Kerala, India. A brief diagnosis, details of the material examined, and images of dorsal habitus for all collected species are also provided. All measurements are rounded to the nearest 0.5 mm or the next whole number (with values 0.00–0.24 mm rounded down to 0.0 mm, 0.25–0.74 mm to 0.5 mm, and 0.75–0.99 mm up to the next whole number).

Abbreviations. (Repositories where specimens are curated) BMNH – British Museum of Natural History, BBMH – Bishop Museum, Honolulu, Hawaii, DBB – D. B. Baker personal collection, MCZ – Museum of Comparative Zoology, MCSN – Museo Civico di Storia Naturale, Genova, MNHUB – Museum für Naturkunde an der Humboldt Universität zu Berlin, MNHNP – Museum National d'Histoire Naturelle Paris, NMV – Naturhistorisches Museum, Vienna, OUMNH – Oxford University Museum of Natural History RMNH – Rijksmuseum Van Natuurlijke Historie, USNM – United States National History Museum, UZMK – University of Copenhagen Zoological Museum. Legators: CSA – Cherodath Sankar Athul, AVV – Azhakath Viswambharan Vishnu,, ASP – Anju Sara Prakash.

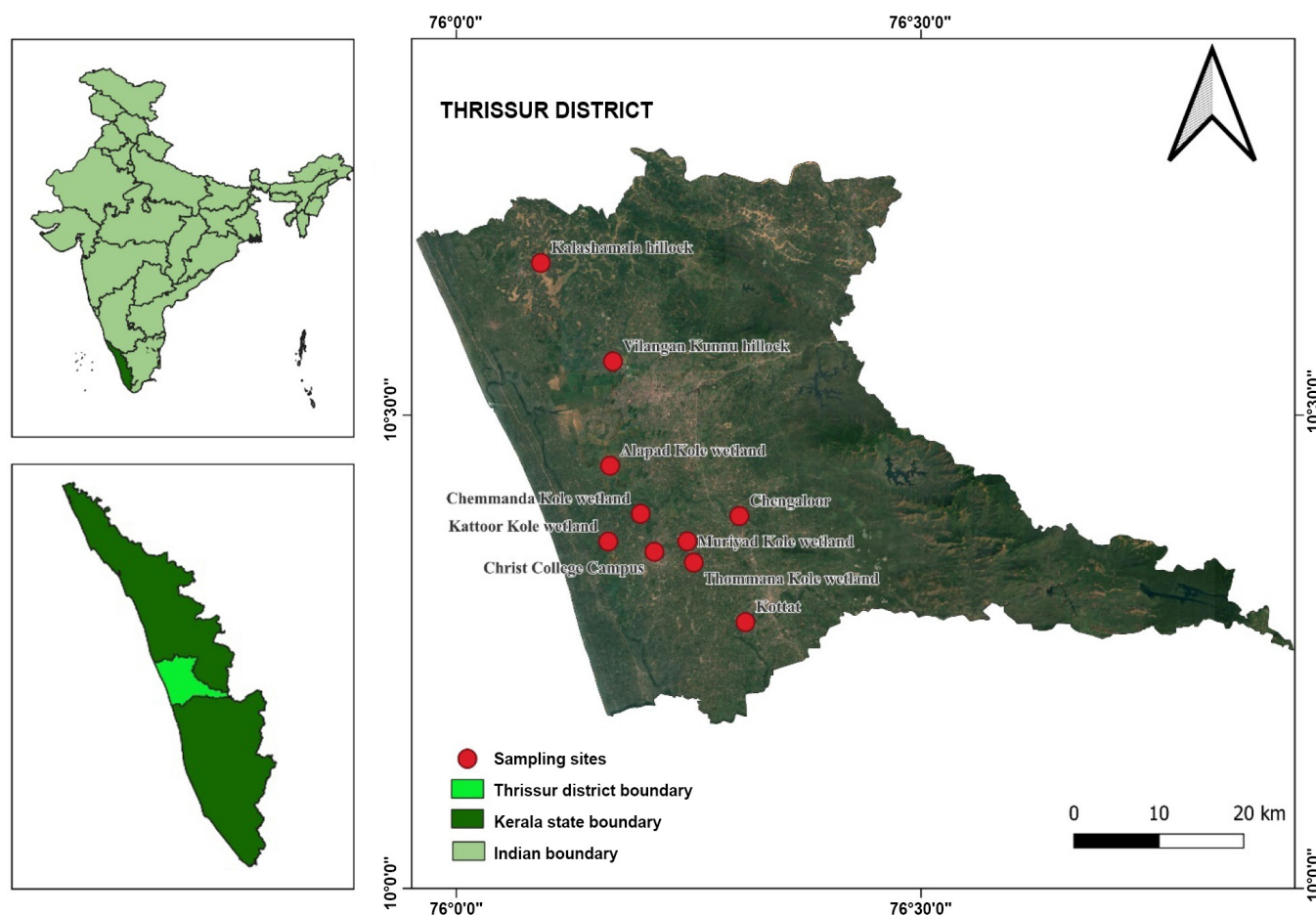


Figure 1. Map showing the study area and sampling sites.

RESULTS

Taxonomic hierarchy

Class Insecta Linnaeus, 1758

Order Hymenoptera Linnaeus, 1758

Superfamily Apoidea Latreille, 1802

Family Halictidae Thomson, 1869

Subfamily Nomiinae Robertson, 1904

Genus *Austronomia* Michener, 1965

Type species: *Nomia australica* Smith, 1875, by original designation.

Brief diagnosis. ♀, Glossa often short. Females have complete basitibial plate (pointed or rounded), continuous carina along pronotum absent, transverse apical hairy bands on terga present. ♂, Metasoma black, rarely amber.

***Austronomia arcuata* Pauly, 2009**

Austronomia arcuata Pauly, 2009:197. Holotype ♂. Bombay Distr. – BMNH.

Distribution in India. Karnataka, Kerala, Madhya Pradesh, Maharashtra, Puducherry (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

***Austronomia capitata* (Smith, 1875) (Fig. 2A–B)**

Nomia capitata Smith, 1875:54. Holotype ♂, Northern India – BMNH.

Material examined. 2♂♂, India, Kerala, Thrissur, Kattoor Kole wetland (10°21'59.3892"N, 76°9'48.4236"E), 21.vi.2023, Swept, leg.: AVV; 1♀♂, Muriyad Kole wetland (10°21'59.9328"N, 76°14'54.4704"E), 9.ix.2023, Swept, leg.: AVV; 1♀ 2♂♂, Chemmunda Kole wetland (10°23'44.6892"N, 76°11'54.1248"E), 28.xii.2023, Swept, leg.: AVV; 1♂, Alapad Kole wetland (10°26'47.5332"N, 76°9'55.3212"E), 17.xi.2023, Swept, leg.: AVV; 1♂ Thommana Kole wetland (10°20'39.066"N, 76°15'19.602"E), 23.ix.2023, Swept, leg.: CSA; 1♂, Chengaloor, near Kurumali river (10°23'36.0744"N, 76°18'16.4376"E), 26.xii.2023, Swept, leg.: CSA; 1♀, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 15.xii.2023, Swept, leg.: CSA.

Brief diagnosis. ♂, Body length less than 7 mm. Hind tibia slightly swollen, with an elongated and pointed apical lobe bearing two tibial spurs. ♀, Body length, colour and pubescence similar to male, Punctuation on tergites weak.

Distribution in India. Karnataka, Maharashtra, Punjab, West Bengal (Pauly, 2009; Pannure & Belavadi, 2017; Majumder et al., 2024; Ascher & Pickering, 2025), Kerala (**New record**).

General distribution. Oriental – India, Sri Lanka (Ascher & Pickering, 2025).

Floral association. *Tectona grandis* (Lamiaceae) (Pannure & Belavadi, 2017); *Cleome rutidosperma*, *Cleome viscosa* (Cleomaceae), *Cyanthillium cinereum*, *Mikania micrantha* (Asteraceae), *Mimosa pudica*, *Neustanthus phaseoloides* (Fabaceae), *Sesamum radiatum* (Pedaliaceae) (**New records**).

***Austronomia goniognatha* (Cockerell, 1919) (Fig. 2C)**

Nomia goniognatha Cockerell, 1919:7. Holotype ♂, Philippines, Davao, Mindanao – USNM.

Material examined. 2♂♂, India, Kerala, Thrissur, Alapad Kole wetland (10°26'47.5332"N, 76°9'55.3212"E), 15.vi.2023, Swept, leg.: AVV; 1♂, Alapad Kole wetland (10°26'47.5332"N, 76°9'55.3212"E), 24.ii.2023, Swept, leg.: AVV.

Brief diagnosis. ♂, Length 8.5 mm or smaller. Short and dense fulvous hairs on mesoscutum and scutellum. Scape of males with long dense fulvous hairs. Hind femur largely swollen and convex, tibiae thick with truncated apical lobe, with single spur.

Distribution in India. West Bengal (Majumder et al., 2024), Kerala (**New record**).

General distribution. Oriental – Cambodia, India, Indonesia, Southern China (Ascher & Pickering, 2025), Malaysia, Philippines (Pauly, 2025), Singapore (Soh et al., 2023).

Floral association. *Cyperus aromaticus* (Dilleniaceae) (Soh et al., 2023); *Cleome rutidosperma* (Cleomaceae), *Neustanthus phaseoloides* (Fabaceae) (**New records**).

***Austronomia notiomorpha* (Hirashima 1978)**

Nomia (Austronomia) notiomorpha Hirashima, 1978:100. Holotype ♂, Sri Lanka, Wildlife Soc. Bungalow, Hunwilagama, Wilpattu, Anu. District – USNM.

Distribution in India. Karnataka, Kerala, Maharashtra, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental – India, Sri Lanka (Ascher & Pickering, 2025).

Floral association. *Mesosphaerum suaveolens* (Lamiaceae) (Karunaratne et al., 2005).

***Austronomia pseudoscutellata* Pauly, 2009 (Fig. 2D)**

Austronomia pseudoscutellata Pauly, 2009:203. Holotype ♂, South India, Kerala State, Walayar – RMNH.

Material examined. 1♂, India, Kerala, Thrissur, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 21.vii.2023, Swept, leg.: CSA.

Brief diagnosis. ♂, Length 8.5 mm or smaller. Body length, colour and pubescence similar to *A. goniognatha*. Hind tibia with elongated, pointed apical lobe with two spurs.

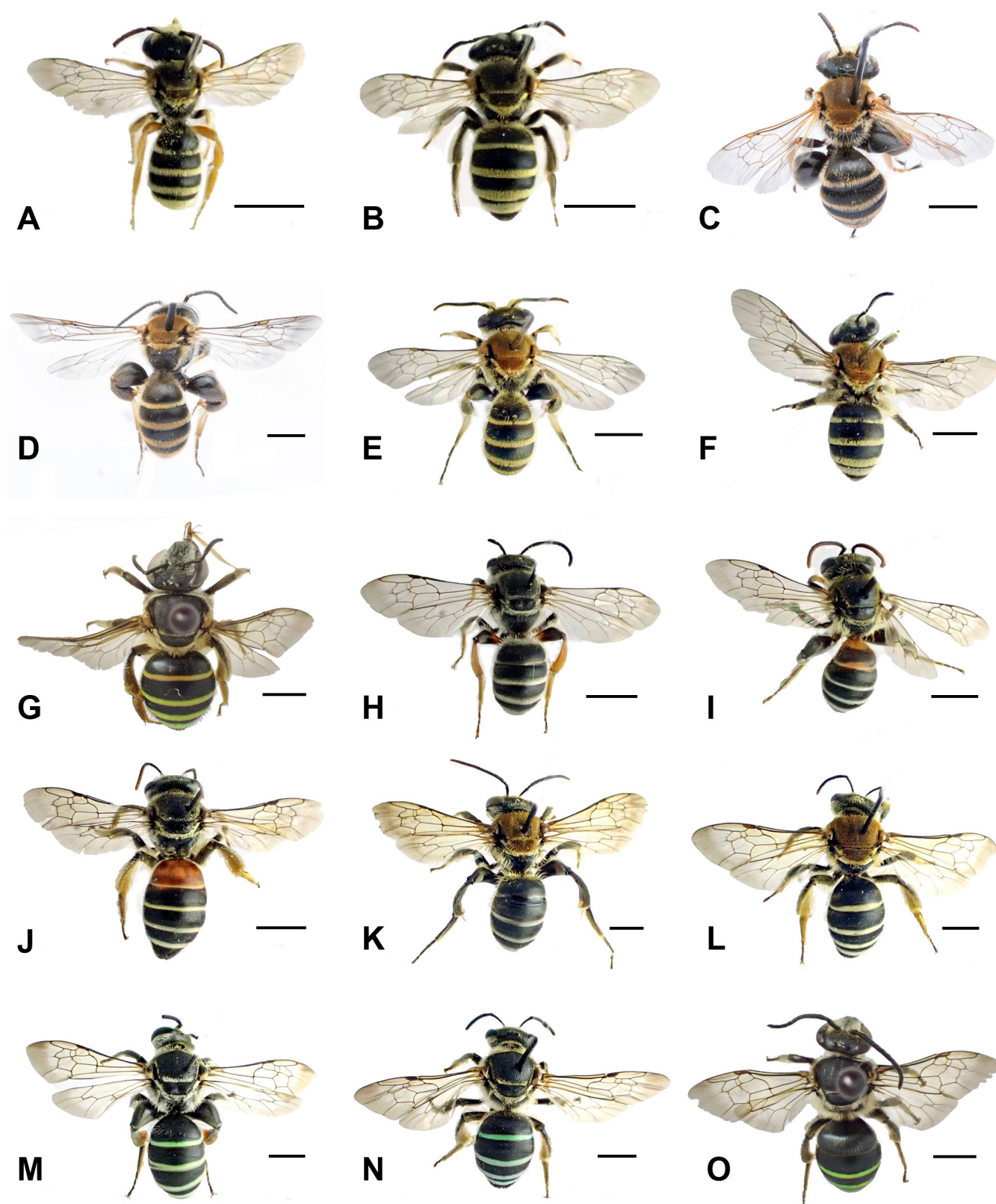


Figure 2. Nomiinae of Kerala, adults dorsal view. **A.** *Austronomia capitata* (Smith, 1875) ♂; **B.** *Austronomia capitata* (Smith, 1875) ♀; **C.** *Austronomia goniognatha* (Cockerell, 1919) ♂; **D.** *Austronomia pseudoscutellata* Pauly, 2009 ♂; **E.** *Austronomia ustula* (Cockerell, 1911) ♂; **F.** *Austronomia ustula* (Cockerell, 1911) ♀; **G.** *Curvinomia strigata* (Fabricius, 1793) ♀; **H.** *Gnathonomia argenteobalteata* (Cameron, 1902) ♂; **I.** *Gnathonomia aurata* (Bingham, 1897) ♂; **J.** *Gnathonomia aurata* (Bingham, 1897) ♀; **K.** *Gnathonomia thoracica* (Smith, 1875) ♂; **L.** *Gnathonomia thoracica* (Smith, 1875) ♀; **M.** *Hoplonomia elliotii* (Smith, 1875) ♂; **N.** *Hoplonomia elliotii* (Smith, 1875) ♀; **O.** *Hoplonomia incerta* (Gribodo, 1894) ♂. Scale bars = 2 mm.

Distribution in India. Karnataka, Kerala, Tamil Nadu, West Bengal (Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

***Austronomia ustula* (Cockerell, 1911) (Fig. 2E-F)**

Nomia ustula Cockerell 1911:231. Holotype ♂, Sri Lanka, Kandy, Comber – BMNH.

Material examined. 2♂♂ 1♀, India, Kerala, Thrissur, Chengaloor, near Kurumali River (10°23'36.0744"N, 76°18'16.4376"E), 11.Vii.2024, Swept, leg.: CSA; 1♂, Muriyad Kole wetland (10°21'59.9328"N, 76°14'54.4704"E), 9.ix.2023, Swept, leg.: AVV; 1♂, Alapad Kole wetland (10°26' 47.5332"N, 76°9'55.3212"E), 24.ii.2024.

Brief diagnosis. ♂, Length 8 mm or smaller. Body length, colour and pubescence similar to *A. pseudoscutellata*. Hind femur moderately thickened, two pointed triangular plates pointing backwards between coxae of middle legs.

Remarks. Females of *Austronomia goniognatha*, *A. pseudoscutellata*, and *A. ustula* cannot be separated (Pauly, 2009) based on the sole morphological characters; here in our study, we associated females with the males based on co-occurring males and females in the same locality multiple times during the surveys.

Distribution in India. Karnataka, Maharashtra (Pauly, 2009; Pannure & Belavadi, 2017; Ascher & Pickering, 2025), Kerala (New record).

General distribution. Oriental – India, Sri Lanka (Ascher & Pickering, 2025).

Floral association. *Centrosema pubescens* (Fabaceae), *Cleome rutidosperma* (Cleomaceae), *Cyanthillium cinereum* (Asteraceae), *Mimosa pudica* (Fabaceae), *Sesamum radiatum* (Pedaliaceae) (New records).

Genus *Curvinomia* Michener, 1944

Type species: *Nomia californiensis* Michener, 1937 = *Nomia tetrazonata* Cockerell, 1910, by original designation.

Brief diagnosis. ♂, Scutellum without projections, calcar of intermediate tibiae shorter with fine closely spaced teeth, ♀, External calcar of hind tibiae bears strong subapical tooth inserted at right angles. Basal plate of hind tibiae keeled in form of a shield, centre being hairy.

***Curvinomia chalybeata* (Smith, 1875)**

Nomia chalybeata Smith, 1875:59, Lectotype ♂, N. Chine, Shangai – BMNH.

Distribution in India. Kerala (Mathew, 2004; Prakash et al., 2020).

General distribution. Oriental – India, Taiwan, Vietnam; Palaearctic – Armenia, China, Japan, South Korea (Ascher & Pickering, 2025)

Floral association. Unknown.

***Curvinomia iridescens* (Smith, 1857)**

Nomia iridescens Smith, 1857:43. Lectotype ♀, Shillong – OUMNH.

Distribution in India. Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Afrotropical – Guinea-Bissau Saint; Australasian – Australia (Macquarie Island); Nearctic – Pierre and Miquelon; Oriental – Cambodia, China, India, Indonesia, Laos, Malaysia, Macau, Myanmar, Negros, Philippines, Singapore, Sri Lanka, Thailand, Vietnam (Pauly, 2009; Ascher & Pickering, 2025).

Floral association. Unknown.

***Curvinomia strigata* (Fabricius, 1793) (Fig. 2G)**

Andrena strigata Fabricius, 1793:311. Neotype ♀, Java, Batavia – UZMK.

Material examined. 1♀, India, Kerala, Thrissur, Kattoor Kole wetland (10°21'59.3892"N, 76°9'48.4236"E), 29.i.2024, Swept, leg.: AVV.

Brief diagnosis. ♀, Body length 10 mm. Enamelled band on first tergite present, horizontal propodeal area delimited posteriorly by a crescent-shaped carina, scutum and first tergite with fine punctuations.

Distribution in India. Andhra Pradesh, Chhattisgarh, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu, Uttar Pradesh, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental - Cambodia, China, India, Indonesia, Laos, Malaysia, Nepal, Philippines, Singapore, Sri Lanka, Thailand (Ascher & Pickering, 2025).

Floral association. *Dillenia suffruticosa* (Dilleniaceae), *Mimosa pudica* (Fabaceae), *Oryza sativa* (Poaceae) (Pannure & Belavadi, 2017; Ascher et al., 2019); *Leucas aspera* (Lamiaceae), *Neustanthus phaseoloides* (Fabaceae) (New records).

Genus *Gnathonomia* Pauly, 2005

Type species: *Nomia nasicana* Cockerell, 1911=*Nomia aurata* Bingham, 1897, by original designation.

Brief diagnosis. ♂, Ovular tegula, apical margins of terga often with narrow white bands, males with strongly developed mandibles with median tooth on upper margin. ♀, Middle tibial spur finely toothed to apex in females, basitibial plates completely carinate across their rims.

***Gnathonomia argenteobalteata* (Cameron, 1902) (Fig. 2H)**

Nomia (*Paranomia*) *argenteobalteata* Cameron, 1902:249. Holotype ♀, Bengal, Rothney – OUMNH.

Material examined. 2♂♂, India, Kerala, Thrissur, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 19.viii.2024, Swept, leg.: CSA.

Brief diagnosis. ♂, Length 8 mm or less. Clypeus with two lateral lamellate structures. Transverse apical tergal bands on metasoma silvery white. hind tibiae shiny, largely orang.

Distribution in India. Kerala (New record).

General distribution. Oriental – India, Sri Lanka (Ascher & Pickering, 2025).

Floral association. Unknown.

***Gnathonomia aurata* (Bingham, 1897) (Fig. 2I–J)**

Nomia aurata Bingham, 1897:458. Lectotype ♂, Tenasserim, Haundraw Valley – BMNH.

Material examined. 1♂, India, Kerala, Thrissur, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 19.xi.2023, Swept, leg.: CSA. 2♀♀ 2♂♂ Kottat, near Chalakudy river (10°16'52.4208"N, 76°18'39.8592" E), 20.i.2024, Swept, leg.: CSA.

Brief diagnosis. ♂, Length 9–12 mm. First two tergites red, hind femur strongly developed and swollen, hind tibia with a C-shaped apical projection. ♀, Body length, colour, pubescence, tergites same as in males.

Distribution in India. Karnataka, Kerala, Punjab, Tamil Nadu, Uttar Pradesh (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2017, 2018; Prakash et al., 2020; Ascher & Pickering, 2025)

General distribution. Oriental – Cambodia, China, India, Laos, Malaysia, Myanmar, Thailand (Ascher & Pickering, 2025).

Floral association. Unknown.

***Gnathonomia thoracica* (Smith, 1875) (Fig. 2K–L)**

Nomia thoracica Smith, 1875:45. Lectotype ♂, Calcutta – BMNH.

Material examined. 3♂♂ 1♀, India, Kerala, Thrissur, Kottat, near Chalakudy river (10°16'52.4208"N,

76°18'39.8592"E), 14.xi.2023, Swept, leg.: CSA. 1♂, Chengaloor, near Kurumali river (10°23'36.0744"N, 76°18'16.4376"E), 15.xii.2023, Swept, leg.: CSA.

Brief diagnosis. ♂, Body length up to 13 mm. Dense short felt-like hairs completely covered over mesoscutum and scutellum, hind femora moderately swollen, hind tibiae curved toward inside, exteriorly swollen gradually to apex. ♀, Body length, colour, pubescence, tergites same as in males.

Distribution in India. Goa, Karnataka, Rajasthan, Sikkim, Tamil Nadu, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental – Cambodia, China, India, Indonesia, Laos, Malaysia, Mindanao, Myanmar, San Clemente, Santiago, Taiwan, Thailand, Vietnam (Ascher & Pickering, 2025).

Floral association. *Buddleja* sp. (Scrophulariaceae), *Hibiscus syriacus* (Malvaceae), *Homonoia riparia* (Euphorbiaceae), *Leonurus japonicus* (Lamiaceae), *Vitex negundo* (Lamiaceae), *Ziziphus spinosa* (Rhamnaceae) (Zhang et al., 2020); *Merremia hederacea* (Convolvulaceae) (Karunaratne et al., 2005); *Cleome rutidosperma* (Cleomaceae), *Mimosa pudica* (Fabaceae), *Sesamum radiatum* (Pedaliaceae) (**New records**).

Genus *Hoplonomia* Ashmead, 1904

Type species: *Hoplonomia quadrifasciata* Ashmead, 1904, by designation of Cockerell, 1910:289.

Brief diagnosis. ♂, Metanotum with two broad lamelliform projections that are basely fused. Scutellum without any projections, if present, very small. Transverse apical enamelled bands on terga present. ♀, Metanotum, Scutellum, tergites same as in males.

Hoplonomia carinata (Smith, 1875)

Nomia carinata Smith, 1875:57. Holotype ♀, Ceylon – BMNH.

Distribution in India. Kerala (Bijoy et al., 2019; Prakash et al., 2020).

General distribution. Oriental – India, Sri Lanka – (Ascher & Pickering, 2025).

Floral association. Unknown.

Hoplonomia elliotii (Smith, 1875) (Fig. 2M–N)

Nomia elliotii Smith, 1875:44. Holotype ♂, India, Madras, Barrackpore and Nischiudipore – OUMNH.

Material examined. 2♂♂, India, Kerala, Thrissur, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 7.ii.2023, Swept, leg.: CSA; 2♂♂, Vilangan Kunnu hillock (10°33'24.3108"N, 76°10'6.7296"E), 1.VIi.2023, Swept, leg.: CSA; 2♂♂ 1♀, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 15.xii.2023, Swept, leg.: CSA; 1♀, Thommana Kole wetland (10°20'39.066"N, 76°15'19.602"E), 23.ix.2023, Swept, leg.: CSA; 1♂, Chengaloor, near Kurumali river (10°23'36.0744"N, 76°18'16.4376"E), 11.vii.2024, Swept, leg.: CSA.

Brief diagnosis. ♂, Body length about 9 mm. Transverse apical enamelled bands on all tergites, scutum with dense punctations. Hind legs completely black, hind femur greatly swollen. ♀, Body length, colour, punctations, pubescence similar to males.

Distribution in India. Arunachal Pradesh, Chhattisgarh, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Punjab, Tamil Nadu, Uttarakhand, West Bengal (Mathew et al., 1987; Mathew, 2004; Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Erra & Shanas, 2019; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Australasia – Papua New Guinea; Oriental – Bangladesh, Bhutan, Cambodia, China, India, Laos, Myanmar, Thailand; (Ascher & Pickering, 2025).

Floral association. *Cajanus cajan* (Fabaceae), *Glycine max* (Fabaceae), *Ipomoea nil* (Convolvulaceae), *Portulaca* sp., (Portulacaceae) (Pannure & Belavadi, 2017; Patel & Pastagia, 2021); *Centrosema pubescens* (Fabaceae), *Cleome rutidosperma* (Cleomaceae), *Mikania micrantha* (Asteraceae), *Mimosa pudica* (Fabaceae) (**New records**).

Hoplonomia incerta (Gribodo, 1894) (Fig. 2O)

Nomia incerta Gribodo 1894:129. Lectotype ♀, Java – Gribodo collection, MCSN.

Material examined. 2♂♂, India, Kerala, Thrissur, Vilangan Kunnu hillock (10°33'24.3108"N, 76°10'6.7296"E), 28.ix.2024, Swept, leg.: CSA.

Brief diagnosis. ♂, Body length 10 mm. Similar to *H. elliotii* in body length, colour, punctations, pubescence, but can be easily separated by the absence of enamelled band on first tergite and moderately swollen hind femora.

Distribution in India. Arunachal Pradesh, Meghalaya, Mizoram (Ascher & Pickering, 2025; Majumder et al., 2024), Kerala (New record).

General distribution. Oriental – China, India, Indonesia, Japan, Malaysia, Philippines, Sumba, Thailand; Palaearctic – Switzerland (Ascher & Pickering, 2025).

Hoplonomia westwoodi (Gribodo, 1894) (Fig. 3A–B)

Nomia westwoodi Gribodo 1894:128. Holotype ♂, India, Barrackpore – BMNH.

Material examined. 3♂♂ 1♀, India, Kerala, Thrissur, Vilangan Kunnu hillock (10°33'24.3108"N, 76°10'6.7296"E), 1.viii.2023, Swept, leg.: CSA; 1♀, Thommana Kole wetland (10°20'39.066"N, 76°15'19.602"E), 22.viii.2023, Swept, leg.: CSA; 1♂ 1♀, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 11.xi.2023, Swept, leg.: CSA.

Brief diagnosis. ♂, Body length 9 mm. Transverse apical enamelled bands on all tergites. Hind legs entirely amber-coloured. Hind femur and tibiae moderately swollen. ♀, Body length, colour, punctations, pubescence similar to males.

Distribution in India. Andhra Pradesh, Chhattisgarh, Delhi, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Pondicherry, Rajasthan, Tamil Nadu, Uttarakhand, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Erra & Shanas, 2019; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental – India, Southern Pakistan, Sri Lanka (Ascher & Pickering, 2025)

Floral association. *Cajanus cajan* (Fabaceae), *Duranta erecta* (Verbenaceae), *Euphorbia pulcherrima* (Euphorbiaceae), *Gossypium hirsutum* (Malvaceae), *Grewia* sp. (Malvaceae), *Leucas aspera* (Lamiaceae), *Ocimum* sp. (Lamiaceae) (Pannure & Belavadi, 2017); *Centrosema pubescens* (Fabaceae), *Cleome rutidosperma* (Cleomaceae), *Cyanthillium cinereum* (Asteraceae), *Mikania micrantha* (Asteraceae), *Mimosa pudica* (Fabaceae), *Neustanthus phaseoloides* (Fabaceae), *Sphagneticola trilobata* (Asteraceae) (New records).

Genus *Leuconomia* Pauly, 1980

Type species: *Nomia candida* Smith, 1875, by original designation.

Leuconomia brevipes (Fries, 1914)

Nomia brevipes Fries, 1914:633. Lectotype ♂, Capland Province du – MNHUB.

Distribution in India. Kerala (Manjusha & Jobiraj, 2018; Prakash et al., 2020).

General distribution. Afrotropical - Lesotho, South Africa; Oriental - India (Ascher & Pickering, 2025)

Floral association. Unknown.

Leuconomia interstitialis (Cameron, 1989)

Nomia interstitialis Cameron, 1898:74. Holotype ♂, Allahabad – OUMNH.

Distribution in India. Karnataka, Kerala, Punjab, Uttar Pradesh, Uttarakhand (Pauly, 2009; Pannure & Belavadi, 2017; Prakash et al., 2020; Ascher & Pickering, 2025).

General distribution. Oriental – India, Sri Lanka, Pakistan (Ascher & Pickering, 2025).

Floral association. *Cuphea hyssopifolia* (Lythraceae), *Triticum aestivum* (Poaceae) (Pannure & Belavadi, 2017).

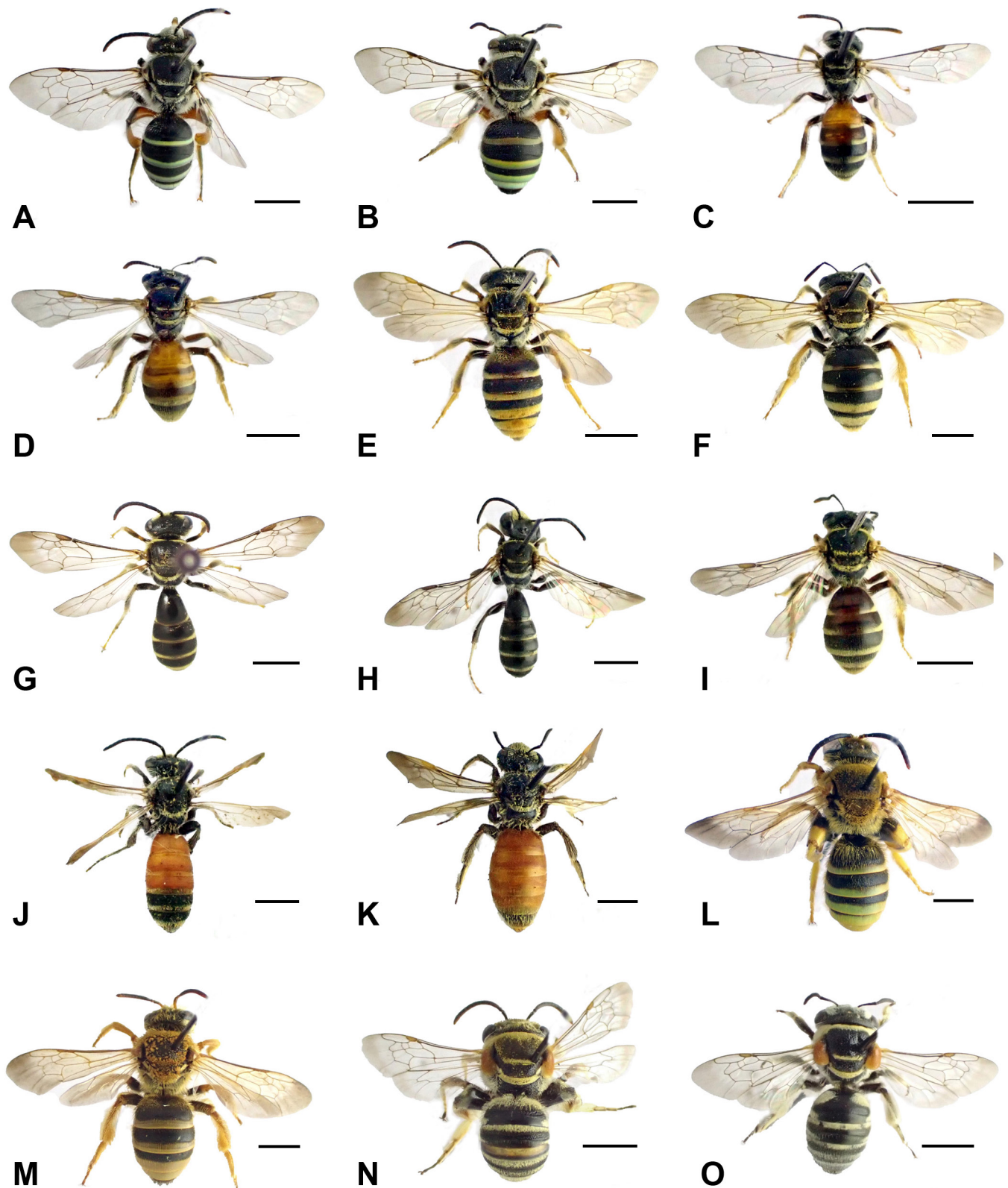


Figure 3. Nomiinae of Kerala, adults dorsal view. **A.** *Hoplonomia westwoodi* (Gribodo, 1894) ♂; **B.** *Hoplonomia westwoodi* (Gribodo, 1894) ♀; **C.** *Lipotriches exagens* (Walker, 1860) ♂; **D.** *Lipotriches exagens* (Walker, 1860) ♀; **E.** *Lipotriches fulvinerva* (Cameron, 1907) ♂; **F.** *Lipotriches fulvinerva* (Cameron, 1907) ♀; **G.** *Lipotriches minutula* (Friese, 1909) ♂; **H.** *Lipotriches pulchriventris* (Cameron, 1897) ♂; **I.** *Lipotriches pulchriventris* (Cameron, 1897) ♀; **J.** *Lipotriches torrida* (Smith, 1879) ♂; **K.** *Lipotriches torrida* (Smith, 1879) ♀; **L.** *Nomia crassipes* (Fabricius, 1798) ♂; **M.** *Nomia crassipes* (Fabricius, 1798) ♀; **N.** *Pseudapis oxybeloides* (Smith, 1875) ♂; **O.** *Pseudapis oxybeloides* (Smith, 1875) ♀. Scale bars = 2 mm.

Leuconomia rufitarsis (Smith, 1875)

Nomia rufitarsis Smith, 1875:67. Lectotype ♂, Angola – BMNH.

Distribution in India. Kerala (Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020).

General distribution. Afrotropical - Angola, Botswana, Cameroon, Kenya, Lesotho, Mali, Malawi, Mozambique, Namibia, Senegal, South Africa, Tanzania, Zambia, Zimbabwe; Oriental - India (Ascher & Pickering, 2025).

Floral association. Unknown.

Genus *Lipotriches* Gerstaecker, 1858

Type species: *Lipotriches abdominalis* Gerstaecker, 1857 = *Sphecodes cribrosus* Spinola, 1843, by original designation.

Brief diagnosis. ♂, Pronotum with a carina along entire anterior edge. ♀, Pronotal carina as in males, incomplete basitibial plate on hind tibiae, hind tibial spur lamellate and without tooth.

Lipotriches aurifrons (Smith, 1853)

Halictus aurifrons Smith, 1853:55. Lectotype ♂, Sierra Leone – BMNH.

Distribution in India. Kerala (Bijoy et al., 2019; Prakash et al., 2020).

General distribution. Afrotropical - Cameroon, Congo, Cote d'Ivoire, Gabon, Liberia, Nigeria, Sierra Leone; Oriental - India (Ascher & Pickering, 2025)

Floral association. Unknown.

Lipotriches exagens (Walker, 1860) (Fig. 3C–D)

Andrena exagens Walker, 1860:305. Holotype ♂, Sri Lanka – BMNH.

Material examined. 1♂, India, Kerala, Thrissur, Chengaloor, near Kurumali River (10°23'36.0744"N, 76°18'16.4376"E), 11.vii.2024, Swept, leg.: CSA; 3♀♀, Vilangan Kunnu hillock (10°33'24.3108"N, 76°10'6.7296"E), 30.i.2023, Swept, leg.: CSA; 3♀♀, Kattoor Kole wetland (10°21'59.3892"N, 76°9'48.4236"E), 21.vi.2023, Swept, leg.: AVV.

Brief diagnosis. ♂, Small species with length 6 mm or less, scutum smooth with spaced punctuations, metasoma orange-red and not pedunculated. Fourth sternite with two small elliptical depressions with pores. ♀, Body length, colour, pubescence, metasoma, scutum as in males.

Distribution in India. Goa, Orissa, Punjab, Rajasthan, Tamil Nadu (Pauly, 2014; Pannure & Belavadi, 2017; Ascher & Pickering, 2025), Kerala (New record).

General distribution. Oriental - India, Sri Lanka (Ascher & Pickering, 2025).

Floral association. Poaceae (New record).

Lipotriches fulvinerva (Cameron, 1907) (Fig. 3E–F)

Nomia fulvinerva Cameron, 1907:1004. Lectotype ♀, Gujarat – BMNH.

Material examined. 2♀♀ 2♂♂, India, Kerala, Thrissur, Kottat, near Chalakudy river (10°16'52.4208"N, 76°18'39.8592"E), 6.xi.2024, Swept, leg.: CSA; 2♀♀, Alapad Kole wetland (10°26'47.5332"N, 76°9'55.3212"E), 19.vii.2023, Swept, leg.: AVV; 2♂♂, Chemmunda Kole wetland (10°23'44.6892"N, 76°11'54.1248"E), 16.x.2023, Swept, leg.: AVV.

Brief diagnosis. ♂, Body length 8 mm. Smooth, impunctate surface around ocelli, vertex not carinate. Dense and fine punctations on first tergite. Slightly thickened hind femora in males. ♀, Body length, colour, pubescence, vertex as in males.

Distribution in India. Assam, Bihar, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Pondicherry, Tamil Nadu, Tripura, West Bengal (Pauly, 2009, 2014; Saini & Rathor, 2012; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental - Bangladesh, India, Myanmar, Pakistan, Sri Lanka (Ascher & Pickering, 2025).

Floral association. *Cleome rutidosperma*, *Cleome viscosa* (Cleomaceae), *Mesosphaerum suaveolens* (Lamiaceae) (Karunaratne et al., 2005); *Torenia asiatica* (Linderniaceae) (**New record**).

***Lipotriches minutula* (Fries, 1909) (Fig. 3G)**

Nomia minutula Fries, 1909:203. Lectotype ♂, Kalidupa Butan, 1902 – NMV.

Material examined. 2♂♂, India, Kerala, Thrissur, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 4.x.2025, Swept, leg.: CSA.

Brief diagnosis. ♂, Body length 6–7 mm, sternite V having a pair of spiny tubercles on both sides, posterior tubercle being compound.

Distribution in India. Maharashtra Tamil Nadu (Ascher & Pickering, 2025; Pannure & Belavadi, 2017), Kerala (**New record**).

General distribution. Oriental – China, India, Indonesia, Laos, Malaysia, Philippines, Thailand, Vietnam (Ascher & Pickering, 2025).

Floral association. Unknown.

***Lipotriches phenacopsis* (Cockerell, 1911)**

Nomia phenacopsis Cockerell, 1911:224. Holotype ♀, Nasik, Western India – BMNH.

Distribution in India. Karnataka, Kerala, Maharashtra, Tamil Nadu, Tripura, West Bengal (Pauly, 2009, 2014; Majumder et al., 2020, 2024; Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

***Lipotriches phenacura* (Cockerell, 1911)**

Nomia phenacura Cockerell, 1911:223. Holotype ♀, Nasik, Western India – BMNH.

Distribution in India. Karnataka, Maharashtra, Pondicherry, Tamil Nadu (Pauly, 2009, 2014; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Majumder et al., 2020, 2024; Ascher & Pickering, 2025).

General distribution. Oriental – India, Sri Lanka (Ascher & Pickering, 2025).

Floral association. Unknown.

***Lipotriches pulchriventris* (Cameron, 1897) (Fig. 3H–I)**

Halictus pulchriventris Cameron, 1897:110. Holotype ♂, Uttarakhand, Mussouri – OUMNH.

Material examined. 1♂, India, Kerala, Thrissur, Chemmunda Kole wetland (10°23'44.6892"N, 76°11'54.1248"E), 25. vii.2023, Swept, leg.: AVV; 2♀♀, Kottat, near Chalakudy river (10°16'52.4208"N, 76°18'39.8592"E), 19.xiii.2023, Swept, leg.: CSA.

Brief diagnosis. ♂, Body length 8 mm. Abdomen pedunculate, apical spur of hind tibiae slightly toothed, hind basitarsi elongate, sternite IV with white and feathery bristles, sternite V with dark long bristles. ♀, Body length, colour, pubescence, wings as in males, first tergite with fine and widely spaced punctuations.

Distribution in India. Assam, Karnataka, Maharashtra, Meghalaya, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, West Bengal (Pauly, 2009, 2014; Pannure & Belavadi, 2017; Majumder et al., 2024; Ascher & Pickering, 2025), Kerala (**New record**).

General distribution. Afrotropical – Malawi; Australasia – Australia, New Guinea, New Zealand; Neotropical – Paraguay; Oriental – China, India, Indonesia, Laos, Malaysia, Nepal, Philippines, Solomon Islands, Sri Lanka, Thailand, Vietnam (Ascher & Pickering, 2025).

Floral association. *Justicia procumbens* (Acanthaceae) (Karunaratne et al., 2005); *Mimosa pudica* (Fabaceae), *Spermacoce alata* (Rubiaceae), *Spermacoce ocymoides* (Rubiaceae) (**New records**).

Lipotriches taprobanae (Cameron, 1897)

Halictus taprobanae Cameron, 1897:111. Holotype ♂, Colombo, Arakawida, Sri Lanka – BBMH.

Distribution in India. Kerala, Puducherry, Tamil Nadu (Pauly, 2014; Leena & Nasser, 2015; Prakash et al., 2020; Ascher & Pickering, 2025).

General distribution. Oriental – India, Sri Lanka (Ascher & Pickering, 2025).

Floral association. Unknown.

Lipotriches torrida (Smith, 1879) (Fig. 3J–K)

Andrena torrida Smith, 1879:50. Holotype ♀, Bombay – BMNH.

Material examined. 1♂ 1♀, India, Kerala, Thrissur, Christ College Campus (10°21'20.0088"N, 76°12'47.0844"E), 4.xi.2021, Swept, leg.: ASP.

Brief diagnosis. ♂, Body length 10 mm. Ocelli raised and oriented in three directions, scutum smooth with sparse punctuation, posterior femora with subapical tooth below but not very pronounced, propodeum completely smooth without punctations, terminal sternites black, wings strongly smoky. ♀, Metasoma completely orange-red.

Distribution in India. Maharashtra (Pauly, 2009, 2014), Kerala (New record).

General distribution. Oriental (Restricted to India).

Floral association. Poaceae (New record).

Genus *Macronomia* Cockerell, 1917

Type species: *Nomia platycephala* Cockerell, 1917, by original designation.

Macronomia antennata (Smith, 1875)

Nomia antennata Smith, 1875:46. Lectotype ♀, India – BMNH.

Distribution in India. Karnataka, Kerala, Madhya Pradesh, Maharashtra, Uttar Pradesh, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. *Tephrosia* sp. (Fabaceae) (Pannure & Belavadi, 2017).

Macronomia dilatata Pauly, 2009

Macronomia dilatata Pauly, 2009:186. Holotype ♂, Walayar Forest, Kerala, India – RMNH.

Distribution in India. Kerala, Tamil Nadu (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

Macronomia karnatakaensis Pauly, 2009

Macronomia karnatakaensis Pauly, 2009:186. Holotype ♂, Karnataka, India – RMNH.

Distribution in India. Karnataka, Kerala, Tamil Nadu (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

Macronomia walayarensis Pauly, 2009

Macronomia walayarensis Pauly, 2009:189. Holotype ♂, Walayar Forest, Kerala, India – RMNH.

Distribution in India. Kerala, Tamil Nadu (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020 Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

Genus *Maynenomia* Pauly, 1984

Type species: *Nomia maynei* Cockerell, 1937, by original designation.

Maynenomia chalcea (Cockerell, 1920)

Nomia chalcea Cockerell, 1920:208. Holotype ♀, Wayanad, South India – USNM.

Distribution in India. Kerala (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020 Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

Maynenomia keralaensis Pauly, 2009

Maynenomia keralaensis Pauly, 2009:192. Holotype ♂, Walayar Forest, South India – RMNH.

Distribution in India. Kerala, Pondicherry, Tamil Nadu. (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020 Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

Maynenomia nathani Pauly, 2009

Maynenomia nathani Pauly, 2009:193. Holotype ♀, Walayar Forest, South India – RMNH.

Distribution in India. Kerala, Pondicherry, Tamil Nadu. (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020 Ascher & Pickering, 2025).

General distribution. Oriental – India, Sri Lanka (Ascher & Pickering, 2025).

Floral association. Unknown.

Genus *Nomia* Latreille 1804 *sensu stricto*

Type species: *Nomia curvipes*, Fabricius, 1793.

Brief diagnosis. ♂, Body length 9 to 13 mm, narrowly rounded tegulae, metasomal tergites with enamelled bands, simple tibial spurs without large teeth, hind femur with tooth. ♀, Females with incomplete basitibial plate. Body length, tegulae, tergites similar to those of males.

Nomia crassipes (Fabricius, 1798) (Fig. 3L–M)

Eucera crassipes Fabricius, 1798:278. Lectotype ♂. Copenhagen – MCZ.

Material examined. 1♀ 1♂, India, Kerala, Thrissur, Manakodiy Kole wetland (10°30'49.2264"N, 76°10'38.8848"E), 19.viii.2023, Swept, leg.: AVV; CSA; 1♂, Alapad Kole wetland (10°26'47.5332"N, 76°9'55.3212"E), 26.viii.2023, Swept, leg.: AVV; 2♀♀ 1♂, Chemmunda Kole wetland (10°23'44.6892"N, 76°11'54.1248"E), 19.viii.2023, Swept, leg.: AVV.

Brief diagnosis. ♂, Body Length 13 mm, yellowish-green apical tergal bands, apical forewings less smoky, metanotum without any projections, greatly swollen and distally curved hind femur, hind tibiae with apical tooth. ♀, Body length, colour, pubescence, metanotum, wings tergites as in males.

Distribution in India. Andhra Pradesh, Chhattisgarh, Delhi, Gujarat, Haryana, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, Uttarakhand, West Bengal (Pauly, 2009; Saini &

Rathor, 2012; Manjusha & Jobiraj, 2018; Pannure & Belavadi, 2017; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental - Bhutan, India, Sri Lanka, South China, Thailand (Ascher & Pickering, 2025).

Floral association. *Mesosphaerum suaveolens* (Lamiaceae), *Justicia procumbens* (Acanthaceae) (Pauly, 2025) *Silybum marianum* (Asteraceae), *Phaseolus vulgaris* (Fabaceae), *Carthamus oxycanthus* (Asteraceae) (Bodlah et al., 2020); *Mimosa pudica* (Fabaceae), *Cleome rutidosperma* (Cleomaceae), *Cyanthillium cinereum* (Asteraceae), *Sesamum radiatum* (Pedaliaceae), *Mikania micrantha* (Asteraceae), *Leucas aspera* (Lamiaceae), *Sphagneticola trilobata* (Asteraceae) (**New records**).

***Nomia curvipes* (Fabricius, 1793)**

Andrena curvipes Fabricius, 1793:310. Lectotype ♂ - UZMK.

Distribution in India. Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Pondicherry, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Manjusha & Jobiraj, 2018; Pannure & Belavadi, 2017; Prakash et al., 2020; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental - India, Myanmar, Nepal, Pakistan (Ascher & Pickering, 2025; Pannure & Belavadi, 2017).

Floral association. *Carthamus oxycanthus* (Asteraceae), *Phaseolus vulgaris* (Fabaceae) (Bodlah et al., 2020).

Genus *Nomiapis* Cockerell, 1919

Type species: *Nomia diversipes* Latreille, 1806.

***Nomiapis bispinosa* (Brulle, 1832)**

Nomia bispinosa Brulle, 1832:348. Lectotype ♂, Mystras, Greece - MNHNP.

Distribution in India. Gujarat, Karnataka, Kerala (Prakash et al., 2020; Ascher & Pickering, 2025).

General distribution. Afrotropical - Madagascar, Senegal, Oriental - India, Philippines, Southeast Pakistan, South China; Palaearctic - Afghanistan, France, Georgia, Greece, Iran, Iraq, Israel, Italy, Kazakhstan, Libya, Malta, Morocco, Portugal, Russia, Spain, Tunisia, Turkmenistan, Turkey (Ascher & Pickering, 2025; Ben Khedher, 2024).

Floral association. *Allium cepa* (Amaryllidaceae), *Centaurea* sp. (Asteraceae), *Echinops spinosissimus* (Asteraceae), *Medicago sativa* (Fabaceae), *Origanum majorana* (Lamiaceae), *Papaver rhoeas* (Papaveraceae), *Peganum harmala* (Nitrariaceae), *Retama raetam* (Fabaceae) (Pauly, 2025).

***Nomiapis carcharodonta* (Baker, 2002)**

Nomiapis carcharodonta Baker, 2002:45. Holotype ♂, Walayar, South India - DDB.

Distribution in India. Kerala (Baker, 2002; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Ascher & Pickering, 2025).

General distribution. Oriental (Restricted to India).

Floral association. Unknown.

Genus *Pachynomia* Pauly, 1980

Type species: *Nomia amoenula* Gerstaecker, 1870, by Original designation.

***Pachynomia aliena* (Cameron, 1898)**

Nomia aliena Cameron, 1898:72. Lectotype ♀, Mussoorie, Rothney - OUMNH.

Distribution in India. Karnataka, Kerala, Maharashtra, Orissa, Uttarakhand (Pauly, 2009; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Prakash et al., 2020; Ascher & Pickering, 2025).

General distribution. Oriental - India, Sri Lanka (Pannure & Belavadi, 2017).

Floral association. *Helianthus annuus* (Asteraceae), *Solanum* sp. (Solanaceae) (Pannure & Belavadi, 2017).

Pachynomia nathani Pauly, 2009

Pachynomia nathani Pauly, 2009:173. Holotype ♀, Kallar, Nilgiri Hills, South India – RMNH.

Distribution in India. Kerala, Tamil Nadu, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental – India, Sri Lanka (Pannure & Belavadi, 2017).

Floral association. *Euphorbia heterophylla* (Euphorbiaceae) (Pannure & Belavadi, 2017).

Genus *Pseudapis* W. F. Kirby 1900

Type species: *Pseudapis anomala* W.F. Kirby, 1900.

Brief diagnosis. ♂, Tegulae strongly developed reaching beyond scutellar suture, presence of pre-occipital carina behind genal area, longitudinally carinate or tuberculate mesepisternum. Transverse pre-coxal carina absent, tergites with apical pubescent bands. ♀, Females with complete basitibial plate on hind tibiae. ♀, Body length, colour, pubescence, tegulae, tergites as in males.

Pseudapis oxybeloides (Smith, 1875) (Fig. 3N–O)

Nomia oxybeloides Smith, 1875:42. Lectotype ♀, Nischiudipore Bangladesh – BMNH.

Material examined. 1♂, India, Kerala, Thrissur, Kalashamala hillock (10°39'39.222"N, 76°5'27.0852"E), 15.xii.2023, Swept, leg.: CSA; 1♂ Kottat, near Chalakudy river (10°16'52.4208"N, 76°18'39.8592"E), 19.xii.2023, Swept, leg.: CSA; 1♀, Vilangan Kunnu hillock (10°33'24.3108"N, 76°10'6.7296"E), 1.Vii.2023, Swept, leg.: CSA; 1♀ 1♂, Chemmanda Kole wetland (10°23'44.6892"N, 76°11'54.1248"E), 16.x.2023, Swept, leg.: AVV.

Brief diagnosis. ♂, Scutellum without any projections, propodeal area limited by a fine carina, hind femur greatly swollen and with long spatulate hairs ventrally, hind tibia compressed and expanded with concave anterior side. ♀, Body length, colour, pubescence, tegulae, tergites as in males.

Distribution in India. Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Pondicherry, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal (Pauly, 2009; Saini & Rathor, 2012; Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018; Majumder et al., 2024; Ascher & Pickering, 2025).

General distribution. Oriental - Bangladesh, India, Sri Lanka; Palaearctic - Russia (Ascher & Pickering, 2025).

Floral association. *Aegle marmelos* (Rutaceae), *Anacardium occidentale* (Anacardiaceae), *Melaleuca citrina* (Myrtaceae), *Sorghum bicolor* (Poaceae), *Tridax procumbens* (Asteraceae) (Pannure & Belavadi, 2017); *Alternanthera sessilis* (Amaranthaceae), *Cyanthillium cinereum* (Asteraceae), *Mikania micrantha* (Asteraceae), *Mimosa pudica* (Fabaceae), *Spermacoce alata* (Rubiaceae), *Sphagneticola trilobata* (Asteraceae) (**New records**).

DISCUSSION

Previous studies stated that Kerala was among the least explored regions for Nomiinae bee fauna (Pannure & Belavadi, 2017; Manjusha & Jobiraj, 2018). However, our study, based on both published literature and field collections, reveals a rich diversity of 42 species, which account for 50.6% of the Nomiinae bee fauna of India (83) and 87.7% of South India (48). Additionally, nine Nomiinae species belonging to four genera are newly recorded from the Kerala state, namely *Austronomia capitata*, *A. goniognatha*, *A. ustula*, *G. argenteobalteata*, *Hoplonomia incerta*, *Lipotriches torrida*, *L. exagens*, *L. minutula*, and *L. pulchriventris*.

Several species recorded from Kerala exhibit broad distributions spanning multiple zoogeographical regions (Fig 4), including the Afrotropical, Australasian, Nearctic, Oriental and Palaearctic regions. *Curvinomia chalybeate* was found in both Oriental and Palaearctic regions, while *C. iridescens* occurs across Oriental, Australasian, Afrotropical and Nearctic regions. *Hoplonomia elliotii* is distributed in the Oriental and Australasian regions, whereas *H. incerta* spans in Oriental and Palaearctic regions.

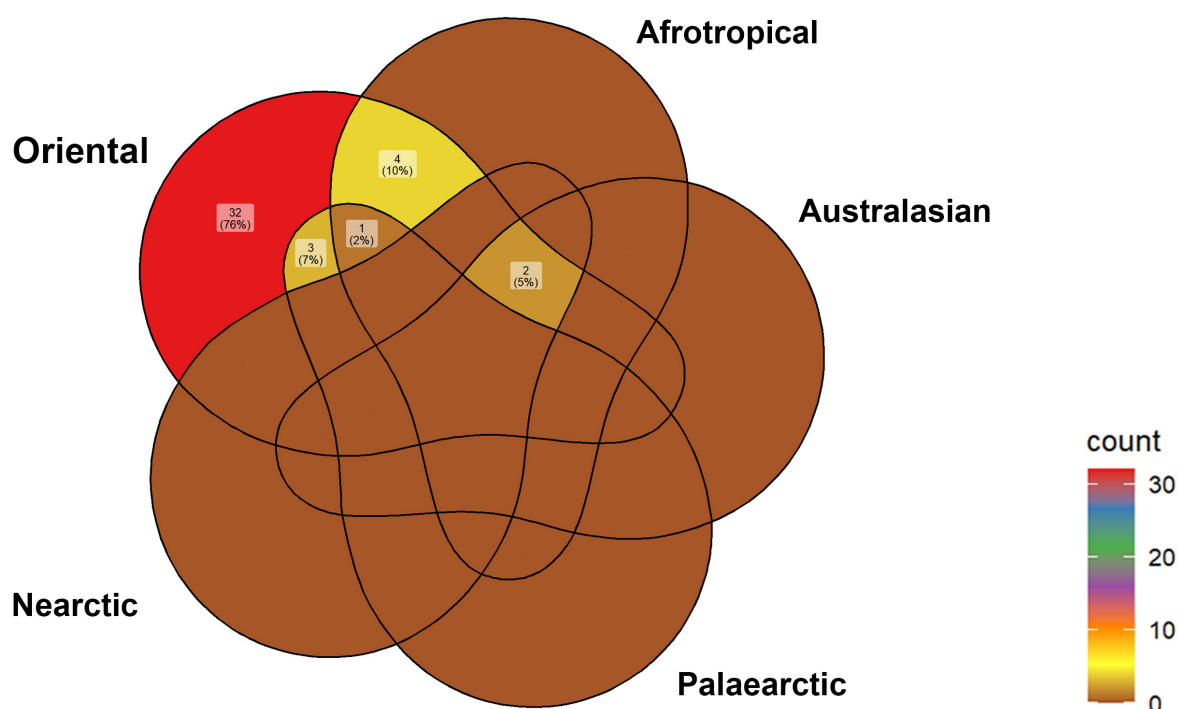


Figure 4. Five-set Venn diagram showing species overlap across regions for Nomiinae species listed from Kerala, colour gradients indicate species count: brown → light orange (0–10), orange → light green (10–20), green → light red (20–30), and red (30+).

Leuconomia brevipes, *Leuconomia rufitarsis* and *Lipotriches aurifrons* are found in the Oriental and Afrotropical, while *Pseudapis oxybeloides* spans the Oriental and Palearctic regions. *Lipotriches pulchriventris* occurs across Oriental, Australasian, Afrotropical and Nearctic regions, and *Nomiapis bispinosa* is found in the Oriental, Afrotropical and Palearctic regions. Additionally, 32 species and two genera namely *Gnathonomia* and *Maculonomia* are endemic to the Oriental region (Pauly, 2009), 11 species are distributed only within India and Sri Lanka, and another 10 species are strictly endemic to India, emphasizing the unique biodiversity of the regions. Two species namely *Maynenomia chalcea* and *Nomiapis carcharodonata* are known only from Kerala. *Lipotriches torrida*, an uncommon species, is reported for the first time outside its type locality. This species was last recorded in 1966, with its type locality in Nashik - Maharashtra (Pauly, 2014). Another rarely collected species, *G. argenteobalteata* with the last collection records from 1902 (Pauly, 2009) without any specific location reference which only mentions location as India, was also re-discovered during the present study. Pauly (2009) also mentioned some specimens of *G. argenteobalteata* collected from Kandy district, Sri Lanka without a specific collection date. According to the third edition of the Singapore Red Data Book (Soh et al., 2024), *A. goniognatha* was considered data deficient, with only a few historical records. This species was recently reported from Northwest India by Majumder et al. (2024). Our study reports the species from peninsular India for the first time. However, a significant geographical gap exists between the new records from Kerala in southwestern India and previous records from West Bengal in the far northeast. A similar distribution pattern was observed in *A. pseudoscutellata*, which also was reported only from these two states. Further studies are needed to better understand the distribution of the species because many intermediate regions remain unexplored. Future studies will likely to help bridge this geographical gap.

Compilation of the floral association of Nomiinae bees revealed that they visited 57 plant species belonging to 27 families (Table 1). Among them, Asteraceae and Fabaceae are the most diverse families with 9 plant species, followed by Lamiaceae with 7 plant species, and then Euphorbiaceae, Malvaceae and Poaceae, each with 3 plant species. Higher bee pollinator diversity is seen among Fabaceae, with 13 species of bees, then by Asteraceae with 9 species, followed by Lamiaceae with 8 species.

Table 1. List of Nomiinae bees recorded in association with different flowering plants.

	Host plant		Recorded species	per plants	per families
	Family	Scientific name			
1	Acanthaceae	<i>Justicia procumbens</i>	<i>Lipotriches pulchriventris</i> , <i>Nomia crassipes</i>	2	2
2	Amaranthaceae	<i>Alternanthera sessilis</i>	<i>Pseudapis oxybeloides</i>	1	1
3	Amaryllidaceae	<i>Allium cepa</i>	<i>Nomiapis bispinosa</i>	1	1
4	Anacardiaceae	<i>Anacardium occidentale</i>	<i>Pseudapis oxybeloides</i>	1	1
5	Asteraceae	<i>Mikania micrantha</i>	<i>Austronomia capitata</i> , <i>Hoplonomia elliotii</i> , <i>Hoplonomia westwoodi</i> , <i>Nomia crassipes</i> , <i>Pseudapis oxybeloides</i>	5	9
6		<i>Sphagneticola trilobata</i>	<i>Hoplonomia westwoodi</i> , <i>Nomia crassipes</i> , <i>Pseudapis oxybeloides</i>	3	
7		<i>Cyanthillium cinereum</i>	<i>Austronomia capitata</i> , <i>Austronomia ustula</i> , <i>Hoplonomia westwoodi</i> , <i>Nomia crassipes</i> , <i>Pseudapis oxybeloides</i>	5	
8		<i>Silybum marianum</i>	<i>Nomia crassipes</i>	1	
9		<i>Carthamus oxycanthus</i>	<i>Nomia crassipes</i> , <i>Nomia curvipes</i>	2	
10		<i>Helianthus annuus</i>	<i>Pachynomia aliena</i>	1	
11		<i>Tridax procumbens</i>	<i>Pseudapis oxybeloides</i>	1	
12		<i>Centaurea</i> sp.	<i>Nomiapis bispinosa</i>	1	
13		<i>Echinops spinosissimus</i>	<i>Nomiapis bispinosa</i>	1	
14	Cleomaceae	<i>Cleome rutidosperma</i>	<i>Austronomia capitata</i> , <i>Austronomia goniognatha</i> , <i>Austronomia ustula</i> , <i>Gnathonomia thoracica</i> , <i>Hoplonomia elliotii</i> , <i>Hoplonomia westwoodi</i> , <i>Lipotriches fulvinerva</i> , <i>Nomia crassipes</i>	8	6
15		<i>Cleome viscosa</i>	<i>Austronomia capitata</i> , <i>Lipotriches fulvinerva</i>	2	
16	Convolvulaceae	<i>Merremia hederacea</i>	<i>Gnathonomia thoracica</i>	1	2
17		<i>Ipomoea nil</i>	<i>Hoplonomia elliotii</i>	1	
18	Cyperaceae	<i>Cyperus aromaticus</i>	<i>Austronomia goniognatha</i>	1	1
19	Dilleniaceae	<i>Dillenia suffruticosa</i>	<i>Curvinomia strigata</i>	1	1
20	Euphorbiaceae	<i>Euphorbia heterophylla</i>	<i>Gnathonomia thoracica</i> , <i>Pachynomia nathani</i>	2	3
21		<i>Homonoia riparia</i>	<i>Gnathonomia thoracica</i>	1	
22		<i>Euphorbia pulcherrima</i>	<i>Hoplonomia westwoodi</i>	1	
23	Fabaceae	<i>Mimosa pudica</i>	<i>Austronomia capitata</i> , <i>Austronomia ustula</i> , <i>Gnathonomia thoracica</i> , <i>Hoplonomia elliotii</i> , <i>Hoplonomia westwoodi</i> , <i>Lipotriches pulchriventris</i> , <i>Nomia crassipes</i> , <i>Pseudapis oxybeloides</i>	8	13
24		<i>Neustanthus phaseoloides</i>	<i>Austronomia capitata</i> , <i>Austronomia goniognatha</i> , <i>Curvinomia strigata</i> , <i>Hoplonomia westwoodi</i>	4	
25		<i>Centrosema pubescens</i>	<i>Austronomia ustula</i> , <i>Hoplonomia elliotii</i> , <i>Hoplonomia westwoodi</i>	3	
26		<i>Cajanus cajan</i>	<i>Hoplonomia elliotii</i> , <i>Hoplonomia westwoodi</i>	2	
27		<i>Glycine max</i>	<i>Hoplonomia elliotii</i>	1	
28		<i>Tephrosia</i> sp.	<i>Macronomia antennata</i>	1	
29		<i>Phaseolus vulgaris</i>	<i>Nomia crassipes</i> , <i>Nomia curvipes</i>	2	
30		<i>Medicago sativa</i>	<i>Nomiapis bispinosa</i>	1	
31		<i>Retama raetam</i>	<i>Nomiapis bispinosa</i>	1	
32	Lamiaceae	<i>Leucas aspera</i>	<i>Curvinomia strigata</i> , <i>Hoplonomia westwoodi</i> , <i>Nomia crassipes</i>	3	8
33		<i>Tectona grandis</i>	<i>Austronomia capitata</i>	1	
34		<i>Mesosphaerum suaveolens</i>	<i>Austronomia notiomorpha</i> , <i>Lipotriches fulvinerva</i> , <i>Nomia crassipes</i>	3	
35		<i>Vitex negundo</i>	<i>Gnathonomia thoracica</i>	1	
36		<i>Leonurus japonicus</i>	<i>Gnathonomia thoracica</i>	1	
37		<i>Origanum majorana</i>	<i>Nomiapis bispinosa</i>	1	
38		<i>Ocimum</i> sp.	<i>Hoplonomia westwoodi</i>	1	
39	Linderniaceae	<i>Torenia asiatica</i>	<i>Lipotriches fulvinerva</i>	1	1
40	Lythraceae	<i>Cuphea hyssopifolia</i>	<i>Leuconomia interstitialis</i>	1	1

	Host plant		Recorded species	per plants	per families
	Family	Scientific name			
41	Malvaceae	<i>Hibiscus syriacus</i>	<i>Gnathonomia thoracica</i>	1	2
42		<i>Grewia</i> sp.	<i>Hoplonomia westwoodi</i>	1	
43		<i>Gossypium hirsutum</i>	<i>Hoplonomia westwoodi</i>	1	
44	Myrtaceae	<i>Melaleuca citrina</i>	<i>Pseudapis oxybeloides</i>	1	1
45	Nitrariaceae	<i>Peganum harmala</i>	<i>Nomiapis bispinosa</i>	1	1
46	Papaveraceae	<i>Papaver rhoeas</i>	<i>Nomiapis bispinosa</i>	1	1
47	Pedaliaceae	<i>Sesamum radiatum</i>	<i>Austronomia capitata</i> , <i>Austronomia ustula</i> , <i>Gnathonomia thoracica</i> , <i>Nomia crassipes</i>	4	4
48	Poaceae	<i>Oryza sativa</i>	<i>Curvinomia strigata</i>	1	3
49		<i>Triticum aestivum</i>	<i>Leuconomia interstitialis</i>	1	
50		<i>Sorghum bicolor</i>	<i>Pseudapis oxybeloides</i>	1	
51	Portulacaceae	<i>Portulaca</i> sp.	<i>Hoplonomia elliotii</i>	1	1
52	Rhamnaceae	<i>Ziziphus spinosa</i>	<i>Gnathonomia thoracica</i>	1	1
53	Rubiaceae	<i>Spermacoce ocymoides</i>	<i>Lipotriches pulchrivertris</i>	1	1
54	Rutaceae	<i>Aegle marmelos</i>	<i>Pseudapis oxybeloides</i>	1	1
55	Scrophulariaceae	<i>Buddleja</i> sp.	<i>Gnathonomia thoracica</i>	1	1
56	Solanaceae	<i>Solanum</i> sp.	<i>Pachynomia aliena</i>	1	1
57	Verbenaceae	<i>Duranta erecta</i>	<i>Hoplonomia westwoodi</i>	1	1

The least species diversity of bees (single species) was found in 17 plant families such as Amaryllidaceae, Amaranthaceae, Anacardiaceae, Cyperaceae, Dilleniaceae, Linderniaceae, Lythraceae, Myrtaceae, Nitrariaceae, Papaveraceae, Portulacaceae, Rhamnaceae, Rubiaceae, Rutaceae, Scrophulariaceae, Solanaceae, and Verbenaceae. The present study documented 52 new combinations of floral associations between Nomiinae bees and their foraging plants, significantly expanding the known pollination networks for this subfamily. Among the newly documented floral associations for these bees, 14 plant species had no prior records of association, including five plant families (Amaranthaceae, Cleomaceae, Linderniaceae, Pedaliaceae and Rubiaceae), previously unreported for Nomiinae interactions. Notably, six of these plants, namely *Centrosema pubescens* (Fabaceae), *Mikania micrantha* (Asteraceae), *Neustanthus phaseoloides* (Fabaceae), *Sesamum radiatum* (Pedaliaceae), and *Sphagneticola trilobata* (Asteraceae), are invasive in Kerala (Sankaran et al., 2012). This baseline data, previously unreported in the literature, emphasises how crucial regional surveys are for uncovering little-known biotic interactions, which are essential for biodiversity management. While our study is the first attempt to compile a list of Nomiinae-plant associations for this region, comparable regional datasets from other regions will help to reveal the connection between the distribution range of the Nomiinae species and the preferred plant species.

Despite the considerable importance of these bees in food security and ecosystem services, their ecology at the species level remains largely unknown. Bee extinctions have been reported in well-studied countries such as Singapore (Ascher et al., 2019; Warrit et al., 2023), but their status in India remains poorly understood. Comprehensive documentation of these bees, along with their floral preferences and updated distributional records, is essential for informing conservation strategies and assessing their conservation status.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution to the paper as follows: C.S. Athul: Collection, identification, photography, manuscript preparation, literature review; A.V. Vishnu: Collection and checklist preparation; A.S. Prakash: Collection; C. Bijoy: Supervising, Correspondence and reviewing of the manuscript; E.M Shaji: Supervising and reviewing of the manuscript. The authors read and approved the final version of the manuscript.

FUNDING

The work was partially funded by the Kerala State Council for Science, Technology and Environment (KSCSTE) under the project “Study on Diversity and Ecology of non-Apis bees (Insecta: Hymenoptera) in the Thrissur Kole wetlands to enhance pollinator conservation.”

AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the Shadpada Entomology Research Lab (SERL) at Christ College (Autonomous), Irinjalakuda, Thrissur, Kerala, India, and are available from the curator, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included plants and arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

ACKNOWLEDGMENTS

We thank the principal of Christ College (Autonomous) Irinjalakuda for all the facilities provided, Alain Pauly (Royal Belgian Institute of Natural Sciences, Brussels) and N. Warrit (Chulalongkorn University, Bangkok) for helping in the identification of bees, R Soumya (Department of Botany, Christ College Autonomous, Irinjalakuda) for assisting in the identification of plant species. The first and third authors are thankful to UGC and CSIR, under the Government of India, for financial support in the form of a junior research fellowship, respectively. The second and fourth authors gratefully acknowledge the funding support from the Kerala State Council for Science, Technology and Environment (KSCSTE). We sincerely thank the anonymous reviewers for their constructive feedback, which significantly improved the quality of the manuscript.

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فهرست زنبورهای زیرخانواده Nomiinae (Hymenoptera, Halictidae) از کرالا، هند: گزارش‌های جدید از انتشار و گیاهان مرتبط

آثول سانکار چروادات^۱، ویشنو ویسوامباران آژاکات^۱، آنجو سارا پراکاش^۱، چنتاماراکشان بیجوی^{۱*}، اداپیلی متیو شاجی^۲

۱ آزمایشگاه تحقیقات حشره‌شناسی شادپادا، گروه جانورشناسی، کالج کریست (خودگردان)، ایرینجالاکودا، کرالا، هند.

۲ گروه جانورشناسی، کالج دولتی K.K.T.M، پلوت، تریسور، کرالا، هند

* پست الکترونیک نویسنده مسئول مکاتبه: bijoyc@christcollegeijk.edu.in

| تاریخ دریافت: ۰۷ اسفند ۱۴۰۳ | تاریخ پذیرش: ۰۱ اردیبهشت ۱۴۰۴ | تاریخ انتشار: ۳۱ تیر ۱۴۰۴ |

چکیده: در این تحقیق، هشت گونه از زنبورهای زیرخانواده Nomiinae (Hymenoptera, Halictidae) شامل *A. ustula* (Cockerell, 1911)، *A. goniognatha* (Cockerell, 1919)، *Austronomia capitata* (Smith, 1875)، *Lipotriches*، *Hoplonomia incerta* (Gribodo, 1894)، *Gnathonomia argenteobalteata* (Cameron, 1902)، *L. exagens* (Walker, 1860)، *torrida* (Smith, 1879) و *Lipotriches minutula* (Friese, 1909)، *L. pulchriiventris* (Cameron, 1897) برای اولین بار از کرالا، هند گزارش شدند. زنبور گونه‌ای کمیاب است که حضور آن برای اولین بار خارج از منطقه توصیف اولیه ثبت شده است. گونه نسبتاً غیر رایج دیگر، *G. argenteobalteata*، آخرین بار در سال ۱۹۰۲ از مکانی نامشخص در هند ثبت شده بود و در مطالعه حاضر دوباره کشف شد. چک لیست جامع شامل ۴۲ گونه از زنبورهای Nomiinae در منطقه کرالا شامل اطلاعات جدید از انتشار و گیاهان مرتبط به آنها بر اساس گزارشات ثبت شده و جدید ارایه شد. ویژگی‌های افتراقی به طور مختصر برای تمامی گونه‌های جمع‌آوری شده نیز ارایه شد.

واژگان کلیدی: افتراق گونه‌ها، خاورزمین، گرده‌افشان‌ها، کشف مجدد، گسترش انتشار