https://doi.org/10.33307/entomon.v45i3.550
Entomon 45(3): 189-200 (2020)
Article No. ent. 45304

A checklist of bees (Insecta: Hymenoptera: Apoidea) of Kerala

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ABSTRACT: A checklist of bee species from Kerala based on literature survey belonging to three families are listed. Accordingly 86 species of bees under 19 genera are enumerated.

KEYWORDS: Bee fauna, Apidae, Halictidae, Megachilidae

INTRODUCTION

Bees are the group of beneficial insects belong to the order Hymenoptera. They are the members of the superfamily Apoidea and are further classified into seven families namely, Apidae, Halictidae, Megachilidae, Andrenidae, Colletidae, Melittidae and Stenotritidae (Michener, 2007). Bees are known for their important role as pollinators in nature since they provide valuable pollination services to many crops and natural vegetations (Free, 1993; Delaplane and Mayer 2000; Michener, 2007; Thakur, 2012). There are 20,473 described species of bees in the world (Ascher and Pickering, 2020). Bees exhibit a wide range of lifestyles from solitary to social (Benton, 2017). Honey bees, bumblebees and stingless bees are social bees. They live in colonies in which the members follow the division of labour.

In India, important works on the taxonomy of the bees were done by Bingham (1897). Jobiraj (2002) conducted studies on the systematics of the bee family Apidae of Kerala. Gupta in 2003 published an annotated catalogue of bees of Indian region. Saini and Rathor (2012) published an Indian checklist of Halictidae family bees and reported 194 species under 27 genera. In 2017, Pannure and Belavadi published a distributional checklist of subfamily Nomiinae of South India and recorded 48 species under 13 genera. Sheeja and Jobiraj (2017) conducted studies on the bee fauna of the Vanaparvam biodiversity park, Kozhikode, Kerala and identified 18 species belong to 9 genera. In 2018, Manjusha and Jobiraj published a checklist of Nomiinae subfamily of Kerala which contains 25 species under 12 genera. Bijoy *et al.* (2019) recorded 19 species of bees belonging to 7 genera from rice ecosystems of Palakkad. In India there are 796 species of bees under 71 genera (Pannure and Belavadi, 2019). The present checklist provides a list of the bee fauna of Kerala.

MATERIALS AND METHODS

This checklist was prepared entirely based on a literature survey and no specimens are examined for this purpose. Details regarding the bee diversity

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of Kerala were collected from various sources including published articles, books, catalogues, checklists etc. Visit to KFRI, Peechi was made during this study for collecting information.

RESULTS AND DISCUSSION

The species reported from each genus from these families along with the distributions and references are given. All literature surveyed is provided in the reference section.

Family Apidae

It is the largest family of bees under superfamily Apoidea. This family consist of honey bees, bumblebees and other solitary bees and some cleptoparasites. They belong to the group of long-tongued bees. In India, there are 225 species of Apidae bees under 25 genera (Pannure and Belavadi, 2019).

Genus *Amegilla* Friese, 1897

They are medium to large-sized bees. Some members have blue metallic bands on the abdomen and are commonly called blue-banded bees. Their body and legs are hairy and face with yellow to white or reddish yellow to brown markings. Wing venation is well developed.

1. ***Amegilla zonata* (Linnaeus, 1758)**

   Source: Suresh *et al.* (1999), Mathew (2004, 2009), Erra and Shanas (2019)

   Distribution: Parambikulam wildlife sanctuary (Palakkad), New Amarambalam reserve forest (Malappuram), Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha.

2. ***Amegilla niveocincta* (Smith, 1854)**

   Source: Suresh *et al.* (1999), Mathew (2004, 2009)

   Distribution: Parambikulam wildlife sanctuary (Palakkad), New Amarambalam reserve forest (Malappuram)

3. ***Amegilla confusa* (Smith, 1854)**

   Source: Suresh *et al.* (1999), Mathew (2004)

   Distribution: Parambikulam wildlife sanctuary (Palakkad)

4. ***Amegilla pilipes* Fabricius, 1775**

   Source: Bingham (1897), Sheeja and Jobiraj (2017)

   Distribution: Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

Genus *Apis* Linnaeus, 1758

They are moderate-sized bees with social lifestyle. Their colony consists of queen, workers and drones. They produce honey and wax. This genus enjoys cosmopolitan distribution.

5. ***Apis dorsata* Fabricius, 1793**

   Source: Mathew *et al.* (2004a, 2004b, 2005, 2007), Suresh *et al.* (1999), Mathew (2004, 2009), Sheeja and Jobiraj (2017), Erra and Shanas (2019).

   Distribution: Silent valley, Nelliampathy, Parambikulam (Palakkad), Neyyar wildlife sanctuary, Peppara Wildlife sanctuary (Thiruvananthapuram), Peechi-Vazhani wildlife sanctuary (Thrissur), New Amarambalam reserve forest (Malappuram), Vanaparvam biodiversity park, Kakkavayal (Kozhikode), Kollam, Alappuzha, Pathanamthitta, Kasaragod.

6. ***Apis cerana* Fabricius, 1793**

   Source: Mathew *et al.* (2004a, 2004b, 2005, 2007), Suresh *et al.* (1999), Mathew and Mohanadas (2001), Mathew (2004, 2009), Leena and Nasser (2015), Sheeja and Jobiraj (2017), Erra and Shanas (2019).

   Distribution: Silent valley, Nelliampathy, Parambikulam (Palakkad), Neyyar wildlife sanctuary, Peppara Wildlife sanctuary (Thiruvananthapuram), Shendurney wildlife

sanctuary (Kollam), Peechi-Vazhani wildlife sanctuary (Thrissur), Munnar, Wayanad, New Amarambalam reserve forest (Malappuram), Kannur, Vanaparvam biodiversity park Kakkavayal (Kozhikode), Alappuzha, Pathanamthitta, Kasaragod.

7. ***Apis florea*** **Fabricius, 1787**

Source: Suresh *et al.* (1999), Mathew (2004, 2009), Sheeja and Jobiraj (2017), Erra and Shanas (2019)

Distribution: Parambikulam wildlife sanctuary (Palakkad), New Amarambalam reserve forest (Malappuram), Vanaparvam biodiversity park, Kakkavayal (Kozhikode), Kollam, Pathanamthitta, Thiruvananthapuram.

8. ***Apis mellifera*** **Linnaeus, 1758**

Source: Sheeja and Jobiraj (2017).

Distribution: Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

Genus *Braunsapis* Michener, 1969

They are very small black bees with two submarginal cells in the forewing. Most species have yellow or ivory markings on the face and scopa of female do not form tibial corbicula.

9. ***Braunsapis malliki*** **Rayes, 1991**

Source: Mathew (2004)

Distribution: Kerala

10. ***Braunsapis clarihirta*** **Rayes, 1991**

Source: Mathew (2004)

Distribution: Kerala

11. ***Braunsapis mixta*** **(Smith, 1852)**

Source: Mathew *et al.* (1987), Reyes (1991), Mathew (2004)

Distribution: Nilambur (Malappuram), Peechi (Thrissur), Aluva (Ernakulam)

12. ***Braunsapis picitarsis*** **(Cameron, 1902)**

Source: Reyes (1991), Mathew (2004)

Distribution: Ponmudi (Thiruvananthapuram)

13. ***Braunsapis cupulifera*** **(Vachal, 1895)**

Source: Sheeja and Jobiraj (2017), Bijoy *et al.* (2019)

Distribution: Vanaparvam biodiversity park, Kakkavayal (Kozhikode), Chittur (Palakkad)

14. ***Braunsapis narendrani*** **Jobiraj, 2004**

Source: Jobiraj (2004)

Distribution: Kerala

15. ***Braunsapis puangensis*** **(Cockerell, 1929)**

Source: Reyes (1991)

Distribution: Walayar (Palakkad)

Genus *Ceratina* Latreille, 1802

They are known as small carpenter bees. They are sparsely haired shiny bees and size vary from small to medium. Forewing has three submarginal cells and stigma wider than pre-stigma. Clypeus has an inverted 'T' like appearance.

16. ***Ceratina hieroglyphica*** **Smith, 1854**

Source: Mathew (2004), Leena and Nasser (2015), Sheeja and Jobiraj (2017), Erra and Shanas (2019)

Distribution: Kannur, Vanaparvam biodiversity park, Kakkavayal (Kozhikode), Thiruvananthapuram, Kollam, Pathanamthitta, Kasaragod

17. ***Ceratina binghami*** **Cockerell, 1908**

Source: Bijoy *et al.* (2019), Erra and Shanas (2019)

Distribution: Chittur (Palakkad), Thiruvananthapuram, Kollam, Pathanamthitta, Kasaragod

18. ***Ceratina vechti*** **(Baker, 1997)**

Source: Baker (1997)

Distribution: Thiruvananthapuram

19. ***Ceratina waini*** **(Shiokawa and Sakagami, 1969)**

Source: Gupta and Yanega (2003)

Distribution: Thiruvananthapuram

20. ***Ceratina unimaculata*** **Smith, 1854**

Source: Mathew and Mohanadas (2001), Mathew (2004), Erra and Shanas (2019)

Distribution: Munnar (Idukki), Thiruvananthapuram, Kollam, Pathanamthitta, Kasaragod

21. ***Ceratina simillima*** **Smith, 1854**

Source: Erra and Shanas (2019)

Distribution: Thiruvananthapuram, Kollam, Pathanamthitta, Kasaragod

Genus *Lisotrigona* Moure, 1961

They are minute stingless bees with body length varies from 2.5 to 4.2 mm. Their wing venation is greatly reduced. Submarginal cells absent in forewing and hindwing lack closed cells.

22. ***Lisotrigona chandrai*** **Viraktamath and Sajan Jose, 2017**

Source: Viraktamath and Jose (2017)

Distribution: Kanhangad (Kasaragod), Thaliparamba (Kannur)

23. ***Lisotrigona mohandasi*** **Jobiraj and Narendran, 2004**

Source: Jobiraj and Narendran (2004)

Distribution: Kerala Forest Research Institute, Peechi (Thrissur)

Genus *Tetragonul*a Jurine, 1807

They are stingless bees with size varying from 5 to 12mm. Their forewing has one or two submarginal cells and hindwing with jugal lobe. Worker bees possess vestigial stingers.

24. ***Tetragonula calophyllae*** **Shanas and Faseeh, 2019**

Source: Shanas and Faseeh (2019)

Distribution: Kumbazha (Pathanamthitta), Malayam (Thiruvananthapuram)

25. ***Tetragonula perlucipinnae*** **Shanas and Faseeh, 2019**

Source: Shanas and Faseeh (2019)

Distribution: Ayarote (Kasaragod)

26. ***Tetragonula travancorica*** **Shanas and Faseeh, 2019**

Source: Shanas and Faseeh (2019), Erra and Shanas (2019).

Distribution: Ambanad estate (Kollam), Vellayani, Attingal (Thiruvananthapuram), Alappuzha, Pathanamthitta, Kasaragod.

Remarks: Though Rahman *et al.* (2015) reported *Tetragonula laeviceps* (Smith, 1857) the species in Kerala, but Rasmussen (2008, 2013) observed that this species not found in Kerala. Hence it is not added in the check list. According to Shanas and Faseeh (2019), *Tetragonula iridipennis* (Smith, 1854), which is popularly known as *Trigona iridipennis* do not occur in India. The most widespread species in India is *Tetragonula travancorica* Shanas and Faseeh, 2019. So, *Tetragonula iridipennis* (Smith, 1854) is not included in this checklist.

Genus *Thyreus* Panzer, 1801

They are cleptoparasitic black bees with blue or white patches or spots on metasoma. Their wing venation is well-developed. Their thorax is shorter than metasoma and basitibial plate absent. Females do not possess any pollen-collecting structures.

28. ***Thyreus ramosus*** **(Lepeletier, 1841)**

Source: Suresh *et al.* (1999), Mathew (2004, 2009)

Distribution: Parambikulam wildlife sanctuary (Palakkad), New Amarambalam reserve forest (Malappuram)

Genus *Xylocopa* Latreille, 1802

They are known as large carpenter bees. They enjoy cosmopolitan distribution and are characterized by the absence of stigma in the forewing. They possess very long prestigma and marginal cell. Arolia is mostly absent.

29. ***Xylocopa violacea* (Linnaeus, 1758)**

Source: Sheeja and Jobiraj (2017)

Distribution: Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

30. ***Xylocopa nasalis* Westwood, 1842**

Source: Maa (1938), Gupta and Yanega (2003), Mathew (2004, 2009), Sheeja and Jobiraj (2017)

Distribution: Kochi (Ernakulam), Thiruvananthapuram, New Amarambalam reserve forest (Malappuram), Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

31. ***Xylocopa fenestrata* (Fabricius, 1798)**

Source: Maa (1938), Gupta and Yanega (2003), Sheeja and Jobiraj (2017)

Distribution: Kerala, Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

32. ***Xylocopa ruficornis* Fabricius, 1804**

Source: Mathew *et al.,* (2004a, 2004b, 2005, 2007), Mathew (2004, 2009), Erra and Shanas (2019)

Distribution: Neyyar Wildlife sanctuary, Peppara Wildlife sanctuary (Thiruvananthapuram), Shendurney wildlife sanctuary (Kollam), Peechi-Vazhani wildlife sanctuary (Thrissur), New Amarambalam reserve forest (Malappuram), Alappuzha, Kasaragod.

33. ***Xylocopa aestuans* (Linnaeus, 1758)**

Source: Sheeja and Jobiraj (2017)

Distribution: Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

34. ***Xylocopa auripennis* Lepeletier,1841**

Source: Maa (1938), Gupta and Yanega (2003)

Distribution: Walayar (Palakkad)

35. ***Xylocopa latipes* (Drury, 1773)**

Source: Maa (1938), Gupta and Yanega (2003)

Distribution: Thenmala (Kollam), Thiruvananthapuram

36. ***Xylocopa tenuiscapa* Westwood, 1840**

Source: Maa (1938), Gupta and Yanega (2003)

Distribution: Peechi (Thrissur)

37. ***Xylocopa amethystina* (Fabricius, 1793)**

Source: Maa (1938)

Distribution: Kerala

38. ***Xylocopa tranquebarica* (Fabricius, 1804)**

Source: Maa (1938), Mathew (1993, 2004)

Distribution: Malayatoor (Ernakulam)

Remarks: Apart from these genera from family Apidae, another genus called *Nomada* Scopoli, 1770 was also reported from Kerala (Mathew, 2004) without any species identity from literature. Bees of this genus are commonly known as cuckoo bees. This genus is included in this checklist.

Family Halictidae

They are known as sweat bees. In India, there are 216 species of Halictid bees under 14 genera (Pannure and Belavadi, 2019). They play an important role in the pollination of many crops and vegetation and have a wide range of ecological

adaptations (Saini and Rathor, 2012). According to Ascher and Pickering (2020), genera like *Austronomia, Acunomia, Curvinomia, Gnathonomia, Hoplonomia, Leuconomia, Pachynomia, Macronomia, Maynenomia, Nomiaspis* are now treated as subgenera. Species of bees belonged to these genera are now placed under different genera. The subgenus is also given for such species in this checklist.

Genus *Halictus* Latreille, 1804

This genus mostly found in Palaearctic region, but some species are reported from the Oriental region. Females are characterized by the clypeal truncation at the margins from distal to preapical fimbria, extended downward at each side of the labrum as a small and sharp projection and apex of terga with metasomal hair bands (Saini and Rathode, 2012).

39. ***Halictus tectonae* Narendran and Jobiraj, 2000**

Source: Narendran *et al.* (2000), Mathew (2004)

Distribution: Peechi (Thrissur)

Genus *Lasioglossum* Curtis, 1833

Members of this genus are either cleptoparasites or social bees forming small or large colonies. They are characterized by relatively few scopal hairs and the presence of femoral corbicula.

40. ***Lasioglossum nathanae* Pauly, 2001**

Source: Pauly (2001)

Distribution: Ponmudi (Thiruvananthapuram)

41. ***Lasioglossum serenum* (Cameron, 1897)**

Source: Bijoy *et al.* (2019)

Distribution: Chittur (Palakkad)

42. ***Lasioglossum triste* (Vachal, 1895)**

Source: Bijoy *et al.* (2019)

Distribution: Chittur (Palakkad)

43. ***Lasioglossum vagans* (Smith, 1857)**

Source: Mathew and Mohanadas (2001), Mathew (2004), Bijoy *et al.* (2019)

Distribution: Munnar (Idukki), Chittur (Palakkad)

Genus *Lipotriches* Gerstaecker, 1858

This is a widespread genus in the Oriental region. They are characterized by the presence of pronotal carina at its anterior edge and simple tegulae. The mandible is bidentate or tridentate (Saini and Rathode, 2012).

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

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

45. ***Lipotriches fulvinerva* (Cameron, 1907)**

Source: Manjusha and Jobiraj (2018)

Distribution: Pulpally (Wayanad)

46. ***Lipotriches aurifrons* (Smith, 1853)**

Source: Bijoy *et al.* (2019)

Distribution: Chittur (Palakkad)

47. ***Lipotriches arcuata* (Pauly, 2009)**

Subgenus: *Austronomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

48. ***Lipotriches notiomorpha* (Hirashima, 1978)**

Subgenus: *Austronomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

49. ***Lipotriches pseudoscuetellata*** **(Pauly, 2009)**

Subgenus: *Austronomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

50. ***Lipotriches antennata*** **(Smith, 1875)**

Subgenus: *Macronomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Madayipara (Kannur)

51. ***Lipotriches karnatakaensis*** **(Pauly, 2009)**

Subgenus: *Macronomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

52. ***Lipotriches walayarensis*** **(Pauly, 2009)**

Subgenus: *Macronomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

53. ***Lipotriches dilatata*** **Pauly, 2009**

Subgenus: *Macronomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Mananthavady (Wayanad)

54. ***Lipotriches chalcea*** **(Cockerell, 1920)**

Subgenus: *Maynenomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Mananthavady (Waynad)

55. ***Lipotriches keralaensis*** **(Pauly, 2009)**

Subgenus: *Maynenomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

56. ***Lipotriches nathani*** **(Pauly, 2009)**

Subgenus: *Maynenomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

57. ***Lipotriches exagens*** **(Walker, 1860)**

Source: Leena and Nasser (2015)

Distribution: Kannur

58. ***Lipotriches taprobanae*** **(Cameron, 1897)**

Source: Leena and Nasser (2015)

Distribution: Kannur

Genus *Nomia* Latreille, 1804

They are characterized by the presence of preapical tooth on the underside of the femurs in males and females with incomplete basitibial plate. The metanotum does not have double projections.

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

Source: Mathew (2004), Pannure and Belavadi (2017), Manjusha and Jobiraj (2018), Erra and Shanas (2019)

Distribution: Walayar (Palakkad), Thiruvananthapuram, Kollam, Pathanamthitta, Kasaragod, Alappuzha.

60. ***Nomia crassipes*** **(Fabricius, 1798)**

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Padannakkad (Kasaragod), Walayar (Palakkad)

61. ***Nomia chalybeata*** **Smith, 1875**

Source: Mathew (2004)

Distribution: Kerala

62. ***Nomia carinata*** **Smith, 1875**

Subgenus: *Hoplonomia*

Source: Bijoy *et al.* (2019)

Distribution: Chittur (Palakkad)

63. ***Nomia iridescens*** **Smith, 1857**

Subgenus: *Acunomia*

Source: Manjusha and Jobiraj (2018)

Distribution: Thamarassery (Kozhikode), Malappuram

64. ***Nomia thoracica*** **Smith, 1875**

Subgenus: *Gnathonomia*

Source: Manjusha and Jobiraj (2017)

Distribution: Thachampoyil, Thamarassery (Kozhikode)

65. ***Nomia aurata*** **Bingham, 1897**

Subgenus: *Gnathonomia*

Source: Manjusha and Jobiraj (2017)

Distribution: Kerala

66. ***Nomia elliotii*** **Smith, 1875**

Subgenus: *Hoplonomia*

Source: Mathew *et al*. (1987), Mathew (2004), Pannure and Belavadi (2017), Manjusha and Jobiraj (2018), Erra and Shanas (2019)

Distribution: Nilambur (Malappuram), Peechi (Thrissur), Ponmudi (Thiruvananthapuram), Madayipara (Kannur), Kozhikode, Kollam, Pathanamthitta, Alappuzha, Kasaragod.

67. ***Nomia interstitialis*** **Cameron, 1898**

Subgenus: *Leuconomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

68. ***Nomia rufitarsis*** **Smith, 1875**

Subgenus: *Leuconomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

69. ***Nomia brevipes*** **Friese, 1914**

Subgenus: *Leuconomia*

Source: Manjusha and Jobiraj (2018)

Distribution: Thamarassery (Kozhikode)

70. ***Nomia westwoodi*** **Gribodo, 1894**

Source: Erra and Shanas (2019)

Distribution: Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha, Kasaragod

Genus *Pseudapis* Kirby, 1900

Pseudapis is a widespread genus with enlarged tegulae, which reaches the posterior margin of scutum. Females possess complete basitibial plate.

71. ***Pseudapis oxybeloides*** **(Smith, 1875)**

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Madayipara (Kannur)

72. ***Pseudapis carcharodonta*** **(Baker, 2002)**

Subgenus: *Nomiapis*

Source: Baker (2002), Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

73. ***Pseudapis bispinosa*** **(Brulle, 1832)**

Subgenus: *Nomiapis*

Source: Mathew (2004)

Distribution: Kerala

74. ***Pseudapis aliena*** **(Cameron, 1898)**

Subgenus: *Pachynomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

75. ***Pseudapis nathani*** **(Pauly, 2009)**

Subgenus: *Pachynomia*

Source: Pannure and Belavadi (2017), Manjusha and Jobiraj (2018)

Distribution: Walayar (Palakkad)

Genus *Sphecodes* Latreille, 1804

They are cleptoparasitic bees commonly known as blood bees because a majority of members in this genus are red and black in colour. They are also known as cuckoo bees and lack pollen-collecting hairs.

76. ***Sphecodes invidus*** **(Cameron, 1897)**

Source: Bijoy *et al.* (2019)

Distribution: Chittur (Palakkad)

77. ***Sphecodes rubripes*** **Spinola,1838**

Source: Bijoy *et al.* (2019)

Distribution: Chittur (Palakkad)

78. ***Sphecodes apicatus*** **Smith, 1853**

Source: Bijoy *et al.* (2019)

Distribution: Chittur (Palakkad)

Family Megachilidae

They are long-tongued bees with a solitary mode of lifestyle. This family of bees enjoys cosmopolitan distribution. In India, there are 270 species of Megachilid bees under 27 genera (Pannure and Belavadi, 2019).

Genus *Euaspis* Gerstacker, 1858

This genus consists of cleptoparasitic bees. They are black to bluish coloured bees with red coloured metasoma. Size varies from moderate to large.

79. ***Euaspis edentata*** **Baker, 1995**

Source: Baker (1995)

Distribution: Walayar (Palakkad)

Genus *Coelioxys* Latreille, 1809

They are cleptoparasitic bees characterized by terminally tapering abdomen in both sexes. Females do not possess scopa and T_6 of males with two pairs of preapical spines.

80. ***Coelioxys cuneatus*** **Smith, 1875**

Source: Suresh *et al.* (1999), Mathew (2004)

Distribution: Parambikulam wildlife sanctuary (Palakkad)

81. ***Coelioxys perseus*** **Nurse, 1904**

Source: Bingham (1897)

Distribution: Malabar

Genus *Megachile* Latreille, 1802

They neatly cut leaves for constructing their nests, hence commonly known as leafcutter bees. They are characterized by two submarginal cells in the forewing, absence of basitibial and pygidial plates, scopa on the underside of the abdomen and T_6 of male with transverse preapical carina.

82. ***Megachile centuncularis*** **(Linnaeus, 1758)**

Source: Sheeja and Jobiraj (2017)

Distribution: Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

83. ***Megachile lanata*** **(Fabricius, 1775)**

Source: Suresh *et al.* (1999), Mathew (2004,

2009), Sheeja and Jobiraj (2017), Erra and Shanas (2019)

Distribution: Parambikulam wildlife sanctuary (Palakkad), New Amarambalam reserve forest (Malappuram), Vanaparvam biodiversity park, Kakkavayal (Kozhikode), Thiruvananthapuram, Pathanamthitta.

84. ***Megachile carbonaria* Smith, 1853**

Source: Suresh *et al.* (1999), Mathew (2004), Sheeja and Jobiraj (2017)

Distribution: Parambikulam wildlife sanctuary (Palakkad), Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

85. ***Megachile quartinae* Gribodo, 1884**

Source: Suresh *et al.,* (1999), Mathew (2004), Sheeja and Jobiraj (2017)

Distribution: Parambikulam wildlife sanctuary (Palakkad), Vanaparvam biodiversity park, Kakkavayal (Kozhikode)

86. ***Megachile anthracina* Smith, 1853**

Source: Mathew (2004)

Distribution: Kerala

87. ***Megachile disjuncta* (Fabricius, 1781)**

Source: Mathew (2004), Erra and Shanas (2019)

Distribution: Thiruvananthapuram, Pathanamthitta

Remarks: Apart from these three genera from family Megachilidae, another genus called ***Chelostoma* Latreille, 1809** was also reported from Kerala (Bijoy *et al.,* 2019) without any species identity from literature. This genus is added to the number of bee genera reported from Kerala.

Family Colletidae and Andrenidae

Literature and KFRI collections suggest the presence of three species of bees from the family Colletidae and one species from family Andrenidae. But bee taxonomists suggest that these two families are not found in Kerala. So, further clarifications have to be made on this by conducting taxonomic studies on these specimens. Hence those species are not included in this checklist.

This checklist was prepared entirely based on literature review and it revealed a rich diversity of bees in Kerala. Details regarding the bee diversity of Kerala were collected from various sources including published articles, books, catalogues, checklists etc. According to the literature, bees of the families Apidae, Halictidae, Megachilidae are reported from Kerala.

ACKNOWLEDGEMENTS

The authors are thankful to the Council of Scientific & Industrial Research (CSIR), for financially supporting the research and to the Principal, Christ College, Irinjalakuda and the Head of Forest Entomology department, KFRI, Peechi for all the facilities provided.

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(Received May 25, 2020; revised ms accepted September 27, 2020; printed September 30, 2020)