

## Termites (Isoptera) of Kerala: An updated checklist and comprehensive review of species diversity

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**ABSTRACT:** This paper presents a comprehensive checklist of termites found in Kerala, including their district-wise distribution. A total of 93 species from three families and 34 genera are documented. Among these, Termitidae emerges as the dominant family, encompassing 76 species from 27 genera across four subfamilies. The recent additions to the termite fauna of Kerala include the endemic species *Ceylonitermellus sahyadriensis* Ranjith and Kalleshwaraswamy 2022 and *Prorhinotermes cotym* Joseph, Amina, and Mathew 2023. Notably, the subfamily Termitinae exhibits the highest level of endemism.  
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**KEYWORDS:** Distribution, endemism, Termitidae, Termitinae

### INTRODUCTION

Termites, often overlooked in biodiversity, constitute a fascinating and diverse group of insects that play crucial roles in ecosystems worldwide. Despite their small size, termites maintain significant ecological influence, primarily as decomposers, soil engineers, and contributors to nutrient cycling. There are over 2,942 described living species belonging to 283 genera and 9 families distributed globally (Krishna *et al.*, 2013; Rajmohana *et al.*, 2019; Amina *et al.*, 2022). This diversity spans a range of ecosystems, from tropical rainforests to arid deserts, highlighting the adaptability and resilience of termites. These social insects form complex colonies, exhibiting intricate caste systems and cooperative behaviors that have evolved over millions of years (Krishna *et al.*, 2013). Preserving fauna is crucial in the present moment, activities such as deforestation,

urbanization, and other human-induced changes may lead to a reduction in termite diversity (Kalleshwaraswamy *et al.*, 2018). The variety and number of termite species are influenced by land use and human interventions that modify the environment. Ants and termites, much like earthworms, serve essential ecological functions and offer valuable ecosystem services (Evans *et al.*, 2011). Studying termite diversity not only unveils the intricacies of their biology but also sheds light on the broader ecological interdependencies that sustain diverse ecosystems globally (Kalleshwaraswamy *et al.*, 2018). Although termites are quite diverse in India, more than 10 per cent of the world's termite fauna is shared by Indian termites i.e., approximately 314 species, 53 genera, and six families (Baraik *et al.*, 2024). König (1779) conducted the first-ever taxonomic study on termites in southern India and the last checklist

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was done by Mathew (2015) who reported 58 species from Kerala along with their pest status. The present study attempts to provide an updated list of termite species in Kerala, which should act as a foundation for future taxonomic research.

## MATERIALS AND METHODS

Kerala, a state in southwestern India, is characterized by its diverse and unique geological features. Situated between the Western Ghats and the Arabian Sea, Kerala's geographical coordinates range from approximately 8°18' and 12°48' N latitude to 74°52' and 77°22' E longitude. The state's topography is heavily influenced by the Western Ghats, which contribute to the region's rich biodiversity and play a crucial role in the state's climate patterns. The climate is hot and humid or cold with 25-32°C temperature during the hot season and 23-30°C in the cool season. Kerala receives 2,923 mm of rain annually, which benefits various termites.

This checklist has primarily been based on existing literature. The classification is based on the findings of Krishna *et al.* (2013). Each species listed in the checklist includes information presented in the following sequence: name of the family, name of the genus, name of the species, Synonyms, and distribution in Kerala. The compilation of this list was done using original descriptions and based on published works by Roonwal and Chhotani (1989), Chhotani (1997), Krishna *et al.*, (2013), Amina *et al.*, (2016, 2016a, 2016b, 2020, 2021, 2022), Amina and Rajmohana (2013, 2021) and Ranjith and Kalleshwaraswamy (2021).

## RESULTS

The checklist documenting the three termite families and 93 species reported from Kerala, along with their district-wise distribution, is specified here. Among the reported species, Termitidae Latreille, 1802 emerges as the dominant family, consisting of 76 species across four subfamilies. The family Termitidae also exhibits the highest level of generic diversity, comprising 27 genera. This is followed by Kalotermitidae Froggat, 1897, which includes five genera, and Rhinotermitidae Froggat, 1897,

with three genera. Within the dominant family Termitidae, the genus *Odontotermes* Holmgren, 1910b, belonging to the subfamily Macrotermitinae, demonstrates high species diversity (17 species). This is followed by the genus *Dicuspitermes* Krishna, 1968, and the genus *Microcerotermes* Silvestri, 1901, both from the subfamily Termitinae, each with seven species. The endemism of termites in Kerala is notable, with 41 out of the 93 species (44.08%) and six out of 34 documented genera (17.64%) found to be endemic to South India. Furthermore, the degree of species endemism and generic endemism is notably high in the subfamily Termitinae, which comprises 18 endemic species and 4 endemic genera.

### Checklist of Termites of Kerala

#### Family 1: Kalotermitidae Froggat, 1897; Genus *Cryptotermes* Banks, 1906

##### 1. *Cryptotermes domesticus* (Haviland, 1898)

Synonyms: *Calotermes domesticus* Haviland, 1898; *Calotermes (Cryptotermes) formosae* Holmgren, 1912; *Calotermes (Cryptotermes) kotoensis* Oshima, 1912; *Calotermes (Cryptotermes) ogasawarensis* Oshima, 1913; *Calotermes (Cryptotermes) dentatus* Oshima, 1914; *Cryptotermes campbelli* Light, 1924; *Cryptotermes hermsi* Kirby, 1925; *Calotermes (Cryptotermes) buxtoni* Hill, 1926; *Calotermes (Cryptotermes) gulosus* Hill, 1927; *Calotermes (Cryptotermes) repentinus* Hill, 1927; *Cryptotermes lignarius* Jepson, 1931; *Cryptotermes tectus* Jepson, 1931.

Distribution: Trivandrum (Roonwal and Chhotani 1989; Krishna *et al.*, 2013; Mathew 2015).

##### 2. *C. dudleyi* Banks, 1918

Synonyms: *Calotermes havilandi arasite* Wasmann, 1910; *Calotermes (Cryptotermes) jacobsoni* Holmgren, 1913c; *Planocryptotermes nocens* Light, 1921b; *Cryptotermes thompsonae* Snyder, 1922; *Cryptotermes (Planocryptotermes) primus* Kemner, 1932; *Cryptotermes (Planocryptotermes) javanicus* Kemner, 1934; *Cryptotermes melloi* Chhotani, 1970.

Distribution: Kozhikode, Wayanad, Kannur (Roonwal and Chhotani 1989; Amina and Rajmohana, 2014).

**3. *C. roonwali* Chhotani, 1970**

Distribution: Kannur (Chhotani 1970; Krishna *et al.*, 2013; Mathew 2015)

**Genus *Glyptotermes* Froggatt, 1897**

**4. *Glyptotermes chiraharitae* Amina and Rajmohana, 2016**

Distribution: Kozhikode (Amina and Rajmohana, 2016)

**5. *G. coorgensis* (Holmgren and Holmgren, 1917)**

Synonym: *Calotermes* (*Glyptotermes*) *coorgensis* Holmgren and Holmgren, 1917.

Distribution: Palakkad (Holmgren and Holmgren 1917; Bose 1984; Roonwal and Chhotani 1989; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Amina and Rajmohana 2014; Mathew 2015).

**6. *G. ceylonicus* (Holmgren, 1911)**

Distribution: Kottayam (Joseph *et al.*, 2022).

**Genus *Neotermes* Holmgren, 1911**

**7. *Neotermes fletcheri* (Holmgren and Holmgren, 1917)**

Synonym: *Calotermes* (*Neotermes*) *fletcheri* Holmgren and Holmgren, 1917

Distribution: Kerala.

**8. *N. keralai* Roonwal and Verma, 1972**

Distribution: Trivandrum (Roonwal and Verma 1972; Bose 1984; Roonwal and Chhotani 1989; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015)

**9. *N. nilamburensis* Thakur, 1978**

Distribution: Malappuram (Thakur 1978; Bose 1984; Roonwal and Chhotani 1989; Krishna *et al.*, 2013; Mathew 2015)

**Genus *Postelectrotermes* Krishna 1961**

**10. *Postelectrotermes bhimi* Roonwal and Maiti, 1965**

Distribution: Kottayam (Roonwal and Maiti 1965; Bose 1984; Roonwal and Chhotani 1989; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015)

**11. *P. nayari* Roonwal and Verma, 1971**

Distribution: Trivandrum (Roonwal and Verma 1971; Bose 1984; Roonwal and Chhotani 1989; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015).

**Family 2: Rhinotermitidae Froggatt, 1897;  
Subfamily Coptotermitinae Holmgren, 1910;  
Genus *Coptotermes* Wasmann, 1896**

**12. *Coptotermes beckeri* Mathur and Chhotani, 1969**

Distribution: Kozhikode (Mathur and Chhotani 1969; Bose 1984; Roonwal and Chhotani 1989; Maitii 2006; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Amina *et al.*, 2016).

**13. *C. ceylonicus* Holmgren, 1911**

Distribution: Trivandrum, Thrissur (Roonwal and Chhotani 1989; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015).

**14. *C. heimi* (Wasmann, 1902)**

Synonyms: *Arrhinotermes heimi* Wasmann, 1902; *Coptotermes parvulus* Holmgren, 1913b.

Distribution: Idukki, Ernakulam (Bose 1984; Varma and Swaran 2007; Mathew 2015)

**15. *C. kishori* Roonwal and Chhotani, 1962**

Distribution: Kerala (Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015)

**Subfamily Heterotermitinae Froggatt, 1897;  
Genus *Heterotermes* Froggatt, 1897**

**16. *Heterotermes indicola* (Wasmann, 1902)**

Synonym: *Leucotermes indicola* Wasmann, 1902.

Distribution: Malappuram, Kasaragod (Poovoli and Rajmohana 2013; Mathew 2015)

**17. *H. malabaricus* Snyder, 1933**

Distribution: Kottayam, Palakkad, Malappuram (Krishna *et al.*, 2013; Mathew 2015; Velayuthan *et al.*, 2022)

**Subfamily Prorhinotermitinae Quennedey and Deligne, 1975; Genus *Prorhinotermes* Silvestri, 1909****18. *Prorhinotermes cotym* Joseph, Amina and Mathew, 2023**

Distribution: Kottayam (Joseph *et al.*, 2023a)

**Family 3: Termitidae Latreille, 1802;  
Subfamily Apicotermitinae Grassé and Noirod, 1955; Genus *Euhamitermes* Holmgren, 1912**

**19. *Euhamitermes chhotani* Maitii, 1983**

Distribution: Malappuram (Chhotani 1997; Ranjith *et al.*, 2023)

**Genus *Eurytermes* Wasmann, 1902****20. *Eurytermes topslipensis* (Chaterjee and Thapa, 1963)**

Synonym: *Beesonitermes topslipensis* Chaterjee and Thapa, 1963.

Distribution: Wayanad (Nair and Varma, 1985)

**Genus *Speculitermes* Wasmann, 1902****21. *Speculitermes chadaensis* Chaterjee and Thapa, 1964**

Distribution: Wayanad, Thrissur (Amina *et al.*, 2016a).

**22. *S. emersoni* Bose, 1984**

Distribution: Idukki (Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**23. *S. sinhalensis* Roonwal and Sen-Sarma, 1960**

Synonym: *Speculitermes cyclops sinhalensis* Roonwal and Sen-Sarma, 1960.

Distribution in Kerala: Kottayam, Ernakulam, Wayanad (Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015; Kalleshwaraswamy *et al.*, 2018).

**Subfamily Termitinae Latreille, 1802; Genus *Angulitermes* Sjöstedt, 1924****24. *Angulitermes acutus* Mathur and Sen-Sarma, 1961**

Distribution: Palakkad (Amina and Rajmohana 2021).

**25. *A. keralai* Verma, 1984**

Distribution: Thrissur (Verma 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**Genus *Dicuspiditermes* Krishna, 1968****26. *Dicuspiditermes achankovili* Verma, 1985**

Distribution: Kollam, Kottayam, Ernakulam (Verma 1985; Chhotani 1997; Varma and Swaran 2007; Krishna *et al.*, 2013; Mathew 2015).

**27. *D. gravelyi* (Silvestri, 1922)**

Synonyms: *Capritermes gravelyi* Silvestri, 1922.  
Distribution: Kozhikode, Wayanad (Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Amina *et al.*, 2016b).

**28. *D. hustoni* (Kemner, 1926)**

Synonyms: *Capritermes hutsoni* Kemner, 1926; *Dicuspiditermes hutsoni* (Kemner, 1965).  
Distribution: Wayanad (Amina *et al.*, 2021)

**29. *Dicuspiditermes incola* (Wasmann, 1893)**

Synonyms: *Eutermes incola* Wasmann, 1893; *Capritermes longicornis* Wasmann, 1902; *Dicuspiditermes fletcheri* (Holmgren and Holmgren, 1917); *Dicuspiditermes pername* Thakur and Chatterjee, 1971.

Distribution: Malappuram, Wayanad (Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**30. *D. obtusus* (Silvestri, 1923)**

Synonyms: *Capritermes obtusus* Silvestri, 1923; *Capritermes obtusus abbreviatus* Silvestri, 1923.

Distribution: Ernakulam, Palakkad, Wayanad (Amina and Rajmohana 2021).

**31. *D. sisiri* Chhotani, 1997**

Distribution: Palakkad (Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**32. *D. leghugathrae* Amina and Rajmohana, 2021**

Distribution: Palakkad (Amina *et al.*, 2021).

**Genus *Homalotermes* John, 1925**

**33. *Homalotermes pilosus* (Mathur and Thapa, 1962)**

Synonym: *Microcapritermes pilosus* Mathur and Thapa, 1962.

Distribution: Idukki (Mathur and Thapa 1962; Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**Genus *Indocapritermes* Chhotani, 1997**

**34. *Indocapritermes aruni* Chhotani, 1997**

Distribution: Palakkad (Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**Genus *Krishnacapritermes* Chhotani, 1997**

**35. *Krishnacapritermes dineshan* Amina and Rajmohana, 2020**

Distribution: Idukki (Amina *et al.*, 2020)

**36. *K. maitii* Chhotani, 1997**

Distribution: Idukki (Krishna *et al.*, 2013; Amina *et al.*, 2020).

**37. *K. manikandan* Amina and Rajmohana, 2020**

Distribution: Idukki (Amina *et al.*, 2020).

**38. *K. thakuri* Chhotani, 1997**

Synonym: *Pericapritermes travancorensis* Mathew and Ipe, 2018.

Distribution: Trivandrum, Kollam, Kottayam, Thrissur, Palakkad (Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015; Amina *et al.*, 2020).

**Genus *Labiocapritermes* Krishna, 1968**

**39. *Labiocapritermes distortus* (Silvestri, 1922)**

Synonyms: *Capritermes distortus* Silvestri, 1922; *Pericapritermes vythirii* Verma, 1983.

Distribution: Thrissur (Silvestri 1922; Verma 1983; Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**Genus *Microcerotermes* Silvestri, 1901**

**40. *Microcerotermes beelsoni* Snyder, 1933**

Synonyms: *Microcerotermes championi* Snyder,

1933a; *Microcerotermes lanceolatus* Mathur and Thapa, 1965.

Distribution: Kozhikode (Amina and Rajmohana 2014; Mathew 2015).

**41. *M. cameroni* Snyder, 1934**

Distribution: Ernakulam (Snyder 1934; Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj, 2013; Mathew 2015).

**42. *M. fletcheri* Holmgren and Holmgren, 1917**

Distribution: Thiruvananthapuram, Idukki, Ernakulam, Malappuram (Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Amina and Rajmohana 2014; Mathew *et al.*, 2015).

**43. *M. heimi* Wasmann, 1902**

Distribution: Kerala (Mathew 2015).

**44. *M. minor* Holmgren, 1914**

Distribution: Wayanad (Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Amina *et al.*, 2016b).

**45. *M. pakistanicus* Akhtar, 1974**

Distribution: Kottayam (Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015; Harit *et al.*, 2021).

**46. *M. lahorensis* Akhtar, 1972**

Distribution: Kottayam (Joseph *et al.*, 2023).

**Genus *Pericapritermes* Silvestri, 1914**

**47. *Pericapritermes dunensis* (Roonwal and SenSarma, 1960)**

Distribution: Pathanamthitta, Idukki, Ernakulam (Amina and Rajmohana 2021)

**48. *P. travancorensis* Mathew and Ipe, 2018**

Distribution: Kottayam (Mathew and Ipe, 2018)

**49. *P. topslipensis* Thakur, 1976**

Distribution: Kottayam (Krishna *et al.*, 2013; Amina and Rajmohana 2021).

**Genus *Procapritermes* Holmgren, 1912**

**50. *Procapritermes dakshinae* (Chhotani and Ferry, 1995)**

Synonym: *Malaysiocapritermes dakshinae* Chhotani and Ferry, 1995.

Distribution: Trivandrum (Chhotani and Ferry 1995; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**51. *P. keralai* (Chhotani and Ferry, 1995)**

Synonym: *Malaysiocapritermes keralai* Chhotani and Ferry, 1995.

Distribution: Ernakulam (Chhotani and Ferry 1995; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**Genus *Pseudocapritermes* Kemner, 1934**

**52. *Pseudocapritermes fletcheri* (Holmgren and Holmgren, 1917)**

Synonyms: *Capritermes fletcheri* Holmgren and Holmgren, 1917; *Pseudocapritermes fontanellus* Mathur and Thapa, 1961; *Pseudocapritermes goanicus* Thakur and Chatterjee, 1969; *Pseudocapritermes roonwali* Verma, 1985a.

Distribution: Wayanad (Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**53. *P. kunjepu* Mathew, 2020.**

Distribution: Kottayam (Ipe *et al.*, 2020).

**Genus *Rinacapritermes* Amina and Rajmohana, 2022**

**54. *Rinacapritermes abundans* Amina and Rajmohana, 2022**

Distribution: Kottayam, Kozhikode, Wayanad (Amina *et al.*, 2022).

**55. *Rinacapritermes silvius* Amina and Rajmohana, 2022.**

Distribution: Kottayam, Idukki, Ernakulam, Kozhikode, Wayanad (Amina *et al.*, 2022).

**Genus *Synhamitermes* Holmgren, 1912**

**56. *Synhamitermes quadriceps* (Wasmann, 1902)**

Synonyms: *Amitermes quadriceps* Wasmann, 1902.

Distribution: Thrissur (Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015).

**Subfamily Macrotermitinae Kemner, 1934;  
Genus *Hypotermes* Holmgren, 1913**

**57. *Hypotermes obscuriceps* (Wasmann, 1902)**

Synonyms: *Termes obscuriceps* Wasmann, 1902; *Odontotermes (Hypotermes) marshalli* Kemner, 1926.

Distribution: Kerala (Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013).

**58. *H. xenotermitis* (Wasmann, 1896)**

Synonyms: *Termes xenotermitis* Wasmann, 1896; *Hypotermes nongpriangi* Roonwal and Sen-Sarma, 1956.

Distribution: Kozhikode (Poovoli and Rajmohana 2019).

**Genus *Macrotermes* Holmgren, 1909**

**59. *Macrotermes convulsionarius* (König, 1779)**

Synonyms: *Termes convulsionarii* König, 1779; *Termes estherae* Desneux, 1908.

Distribution: Trivandrum (Chhotani 1997; Rao *et al.*, 2012; Krishna *et al.*, 2013; Mathew 2015).

**Genus *Microtermes* Wasmann, 1902**

**60. *Microtermes obesi* Holmgren, 1912**

Synonyms: *Microtermes anandi* Holmgren, 1913b; *Microtermes anandi curvignathus* Holmgren, 1913b.

Distribution: Thrissur, Malappuram (Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015).

**61. *M. unicolor* Snyder, 1933**

Synonyms: *Microtermes pubescens* Snyder, 1933b.

Distribution: Wayanad (Amina *et al.*, 2016b).

**Genus *Odontotermes* Holmgren, 1910**

**62. *Odontotermes anamallensis* Holmgren and Holmgren, 1917**

Synonyms: *Odontotermes (Odontotermes) anamallensis* Holmgren and Holmgren, 1917.

Distribution: Ernakulam, Palakkad, Malappuram, Kozhikode (Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015; Bhavana *et al.*, 2015; Velayuthan *et al.*, 2022).

**63. *O. assmuthi* Holmgren, 1913**

Synonym: *Odontotermes (Odontotermes) assmuthi* Holmgren, 1913b.

Distribution: Kottayam, Ernakulam, (Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015)

**64. *O. bellahunisensis* Holmgren and Holmgren, 1917**

Synonyms: *Odontotermes (Cyclotermes) bellahunisensis* Holmgren and Holmgren, 1917.

Distribution: Palakkad, Kannur (Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015; Velayuthan *et al.*, 2022)

**65. *O. brunneus* (Hagen, 1858)**

Synonyms: *Termes (Termes) brunneus* Hagen, 1858; *Odontotermes mathadi* Roonwal and Chhotani, 1964a.

Distribution: Palakkad (Chhotani 1997; Rao *et al.*, 2012; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015; Velayuthan *et al.*, 2022).

**66. *O. ceylonicus* (Wasmann, 1902)**

Synonyms: *Termes ceylonicus* Wasmann, 1902; *Odontotermes meturensis* Roonwal and Chhotani, 1959.

Distribution: Ernakulam, Thrissur, Palakkad, Malappuram (Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015; Velayuthan *et al.*, 2022).

**67. *O. escherichi* (Holmgren, 1911)**

Synonym: *Termes escherichi* Holmgren, 1911a.  
Distribution: Kerala (Krishna *et al.*, 2013; Mathew, 2015)

**68. *O. feae* (Wasmann, 1896)**

Synonyms: *Termes feae* Wasmann, 1896; *Odontotermes indicus* Thakur, 1981.

**Distribution:** Kollam, Thrissur, Ernakulam, Palakkad, Malappuram (Chhotani 1997; Rao *et al.*, 2012; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015).

**69. *O. globicola* (Wasmann, 1902)**

Synonyms: *Microtermes globicola* Wasmann, 1902; *Termes (Termes) dehraduni* Snyder, 1933b; *Odontotermes roonwali* Bose, 1975.

Distribution: Palakkad, Malappuram (Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015; Velayuthan *et al.*, 2022).

**70. *O. guptai* Roonwal and Bose, 1961**

Synonyms: *Odontotermes bellahunisensis guptai* Roonwal and Bose, 1961; *Odontotermes lokanandi* Chatterjee and Thakur, 1967.

Distribution: Ernakulam, Thrissur (Chhotani 1997; Rao *et al.*, 2012; Krishna *et al.*, 2013; Mathew 2015; Varma and Swaran 2007).

**71. *O. horni* (Wasmann, 1902)**

Synonyms: *Termes horni* Wasmann, 1902; *Termes peradeniyae* Holmgren, 1911b; *Odontotermes horni hutsoni* Kemner, 1926; *Odontotermes horni minor* Kemner, 1926.

Distribution: Ernakulam, Palakkad, Malappuram, Kannur (Chhotani 1997; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015; Varma and Swaran 2007; Velayuthan *et al.*, 2022).

**72. *O. malabaricus* Holmgren and Holmgren, 1917**

Synonym: *Odontotermes (Odontotermes) malabaricus* Holmgren and Holmgren, 1917.

Distribution: Malappuram (Holmgren and Holmgren 1917; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**73. *O. microdentatus* Roonwal & Sen-Sarma, 1960**

Distribution: Kerala (Krishna *et al.*, 2013; Mathew 2015)

**74. *O. obesus* (Rambur, 1842)**

Synonyms: *Termes obesus* Rambur, 1842; *Termes fatalis* König, 1779; *Odontotermes (Cyclotermes) bengalensis* Holmgren, 1912a; *Odontotermes (Cyclotermes) assamensis* Holmgren, 1913c; *Odontotermes (Cyclotermes) bangalorensis* Holmgren, 1913c; *Odontotermes (Cyclotermes) favomaculatus* Holmgren and Holmgren, 1917; *Odontotermes (Cyclotermes) obesus oculatus* Silvestri, 1923b; *Termes (Cyclotermes) orissae* Snyder, 1934; *Termes obesus assmuthi* Van Boven, 1969.

Distribution: Ernakulam, Palakkad, Malappuram, Wayanad (Chhotani 1997; Rao *et al.*, 2012; Krishna *et al.*, 2013; Mathew 2015; Bhavana *et al.*, 2015).

**75. *O. redemanni* (Wasmann, 1893)**

Synonym: *Termes redemanni* Wasmann, 1893

Distribution: Idukki, Palakkad, Malapuram (Chhotani 1997; Rao *et al.*, 2012; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015; Velayuthan *et al.*, 2022).

**76. *O. vaishno* Bose, 1975**

Distribution: Palakkad, Kozhikode, Wayanad (Bose 1975, 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015; Velayuthan *et al.*, 2022).

**77. *O. wallonensis* (Wasmann, 1902)**

Synonyms: *Termes obesus wallonensis* Wasmann, 1902; *Odontotermes brunneus kushwahai* Roonwal and Bose, 1964.

Distribution: Palakkad (Bose 1984; Chhotani 1997; Rao *et al.*, 2012; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015; Velayuthan *et al.*, 2022).

**78. *O. yadevi* Thakur, 1981**

Distribution: Palakkad, Kozhikode, Wayanad (Thakur 1981; Chhotani 1997; Krishna *et al.*, 2013; Amina *et al.*, 2016b).

**Subfamily Nasutitermitinae Hare, 1937; Genus *Ampoulitermes* Mathur and Thapa, 1962**

**79. *Ampoulitermes wynaadensis* Mathur and Thapa**

Distribution: Wayanad (Mathur and Thapa 1962a; Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**Genus *Ceylonitermellus* Emerson, 1960**

**80. *Ceylonitermellus periyarensis* Amina and Rajmohana, 2013**

Distribution: Idukki (Amina and Rajmohana 2013).

**81. *C. sahyadriensis* Ranjith and Kalleshwaraswamy, 2022**

Distribution: Wayanad (Ranjith and Kalleshwaraswamy, 2022).

**Genus *Ceylonitermes* Holmgren, 1912**

**82. *Ceylonitermes indicola* Thakur, 1976**

Distribution: Wayanad (Thakur 1976; Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**83. *C. paulosus* Ipe and Mathew, 2019**

Distribution: Kottayam (Ipe and Mathew 2019).

**Genus *Emersonitermes* Mathur and Sen-Sarma, 1959**

**84. *Emersonitermes thekadensis* Mathur and Sen-Sarma, 1959**

Distribution: Trivandrum, Idukki (Mathur and Sen-Sarma 1959; Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**Genus *Grallatotermes* Holmgren, 1912**

**85. *Grallatotermes niger* Chatterjee and Thapa 1964**

Distribution: Idukki, Wayanad (Chatterjee and Thapa 1964; Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Amina *et al.*, 2016b).

**Genus *Hospitalitermes* Holmgren, 1912**

**86. *Hospitalitermes monoceros* (König, 1779)**

Synonym: *Termes monoceros atrum* König, 1779. Distribution: Idukki (Amina *et al.*, 2013; Mathew 2015).

**Genus *Nasutitermes* Dudley, 1890**

**87. *Nasutitermes anamalaiensis* Snyder, 1933**

Synonyms: *Nasutitermes (Rotunditermes) anamalaiensis* Snyder, 1933b; *Alstonitermes favescens* Thakur, 1976a.

Distribution: Kerala Krishna *et al.*, 2013; Mathew 2015; Vidyashree *et al.*, 2018).

**88. *N. brunneus* Snyder, 1934**

Synonym: *Nasutitermes (Nasutitermes) brunneus* Snyder, 1934

Distribution: Ernakulam, Malappuram, Kozhikode (Snyder 1934; Bose 1984; Chhotani 1997; Verma and Swaran, 2007; Krishna *et al.*, 2013; Shanbhag and Sundararaj 2013; Mathew 2015).



**89. *N. indicola* (Holmgren and Holmgren, 1917)**

Synonyms: *Eutermes (Eutermes) indicola* Holmgren and Holmgren, 1917; *Eutermes (Eutermes) processionarius* Schmitz, 1924; *Nasutitermes beckeri* Prashad and Sen-Sarma, 1959.

Distribution: Wayanad (Holmgren and Holmgren 1917; Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**90. *N. matangensis matangensis* (Haviland, 1898)**

Synonyms: *Termes matangensis* Haviland, 1898; *Eutermes (Eutermes) matangensiformis* Holmgren, 1913c; *Eutermes djemberensis* Kemner, 1934.

Distribution: Wayanad (Amina *et al.*, 2016b).

**91. *N. cherraensis* Roonwal and Chhotani, 1962**

Distribution: Palakkad (Amina and Rajmohana, 2021).

**92. *N. kali* Roonwal and Chhotani, 1962**

Distribution: Palakkad (Amina and Rajmohana, 2021).

**Genus *Trinervitermes* Holmgren, 1912****93. *Trinervitermes biformis* (Wasmann, 1902)**

Synonyms: *Eutermes biformis* Wasmann, 1902; *Eutermes heimi* Wasmann, 1902; *Nasutitermes (Trinervitermes) longinotus* Snyder, 1934.

Distribution: Malappuram, Kannur (Bose 1984; Chhotani 1997; Krishna *et al.*, 2013; Mathew 2015).

**DISCUSSION**

A compiled list of species in a specific area provides a foundation for future investigations. The complete termite fauna of Kerala has never been thoroughly examined, despite the contributions made by numerous scientists since Wasmann in 1896. In Kerala, there are 93 termite species belonging to three families, namely Kalotermitidae, Rhinotermitidae, and Termitidae. The family Termitidae stands out as the predominant family, encompassing 76 species across four subfamilies, followed by Kalotermitidae with 10 species and then

by Rhinotermitidae with 7 species across three subfamilies. This suggests that there has been an addition to the termite fauna in the state of Kerala following comprehensive research by Mathew (2015) who reported a total of 58 species from 28 genera and 6 subfamilies belonging to 3 families. Later, one subfamily, Prorhinotermitinae (Joseph *et al.*, 2023a), six genera, *Prorhinotermes* (Joseph *et al.*, 2023a), *Pericapritermes* (Mathew and Ipe, 2018), *Rinacapritermes* (Amina *et al.*, 2022), *Hypotermes* (Poovoli and Rajmohana, 2019), *Ceylonitermellus* (Amina and Rajmohana, 2013) and *Grallatotermes* (Amina *et al.*, 2016b) and 33 species were reported from Kerala to date. The degree of endemism among termites found in Kerala is remarkably high. According to Baraik *et al.* (2024), out of the 196 endemic termite species identified in India, 23 are found in Kerala. Of the 93 identified species, 41 (44.08%) are reported as exclusive to southern India. Furthermore, out of the 34 documented genera, 6 (17.65%) are recognized as endemic to southern India. The most recent additions to termite diversity in Kerala include *Ceylonitermellus sahyadriensis* Ranjith and Kalleshwaraswamy 2022 (Ranjith *et al.*, 2022) and *Prorhinotermes cotym* Joseph, Amina and Mathew 2023 (Joseph *et al.*, 2023a) which are endemic to southern Western Ghats and reported only from the type localities in Kerala. The inclusion of the *Prorhinotermes cotym* Joseph, Amina, and Mathew, 2023 adds the genus and the subfamily Prorhinotermitinae, to the termite fauna of Kerala. Furthermore, *Microcerotermes lahorensis* Akhtar, 1974 and *Euhamitermes chhotani* Maitii, 1983 were the two newly recorded species from Kerala by Joseph *et al.* (2023) and Ranjith *et al.* (2023) respectively. Therefore, this study emphasizes Kerala as a region characterized by abundant termite diversity and endemism. The richness of species and endemism is attributed to the presence of the Western Ghats, which encircles approximately half of the state. Given this region's unique environment and geographical positioning, it is reasonable to anticipate the discovery of numerous additional endemic genera and species. This update and review of the termite fauna of Kerala could serve as a valuable resource for researchers, enabling them to anticipate additions

to the termite fauna in the region. It also directs attention towards the conservation of endemic species, guiding efforts aimed at preserving the unique biodiversity of termite fauna of Kerala.

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### REFERENCES

- Amina P., Shweta M. and Rajmohana K. (2016) First record of the pest termite *Coptotermes beckeri* Mathur and Chhotani (Isoptera: Rhinotermitidae) from Kerala. *ENTOMON* 41(1): 73–76.
- Amina P. and Rajmohana K. (2013) First record of the genus *Ceylonitermellus* Emerson (Isoptera: Termitidae: Nasutitermitinae) in Southern India, based on a new mainland species from the Kerala Ghats. *Colemania* 39: 1–10.
- Amina P. and Rajmohana K. (2014) Status, diversity and significance of termites (Insecta: Isoptera) of Kerala. In Proceedings of the national conference on modern trends in zoological research (pp. 254–258).
- Amina P. and Rajmohana K. (2016) *Glyptotermes chiraharitae* n. sp., a new dampwood termite species (Isoptera: Kalotermitidae) from India. *Zoosystema* 38: 309–316.
- Amina P. and Rajmohana K. (2021) New records of six termite (Blattodea: Termitidae) species from Kerala, India. *Journal of Threatened Taxa* 13: 18349–18354.
- Amina P., Rajmohana K. and Bhavana K.V. (2016a) First record of *Speculitermes chadaensis* Chatterjee and Thapa, 1964 (Isoptera: Termitidae) from the Western Ghats, India. *Journal of Threatened Taxa* 8(7): 9042–9044.
- Amina P., Rajmohana K., Dinesh K.P., Asha G., Sinu P.A. and Mathew J. (2020) Two new species of an Indian endemic genus *Krishnacaprtermes* Chhotani (Isoptera: Termitidae) from the Kerala part of the Western Ghats, India. *Oriental Insects* 54: 496–513.
- Amina P., Rajmohana K., Bhavana K.V. and Rabeeha P.P. (2016b) New records of termite species from Kerala (Isoptera: Termitidae). *Journal of Threatened Taxa* 8: 9334–9338.
- Amina P., Rajmohana K. and Aliyas S.C. (2021) A new species and a new record of *Dicuspiditermes* Krishna (Blattodea: Isoptera: Termitidae) from the Kerala part of Western Ghats, India. *Oriental Insects* 55: 552–563.
- Amina P., Rajmohana K., Dinesh K.P. and Asha G. (2022) Integrative taxonomic studies on *Rinacaprtermes* Amina and Rajmohana, n. gen. (Blattodea: Isoptera: Termitidae) with two new species from India. *Zoosystema* 44: 109–124.
- Baraik B., Basak J., Sengupta R. and Rajmohana K. (2024) Fauna of India Checklist: Arthropoda: Insecta: Blattodea (Termites). Version 1: 2.
- Bhavana K.V., Poovoli A., Rajmohana K. and Shweta M. (2015) A comparison on termite assemblages in coffee and teak plantations and semi-evergreen forest—A case study in north Wayanad, Kerala, India.
- Bose G. (1984) Termite Fauna of South India. Zoological Survey of India, Kolkata, India.
- Chatterjee P.N. and Thapa R.S. (1964) A new species of the genus *Grallatotermes* from India (Isoptera: Termitidae: Nasutitermitinae). *Indian Forester* 90: 210–214.
- Chhotani O.B. (1970) Taxonomy, zoogeography and phylogeny of the genus *Cryptotermes* (Isoptera: Kalotermitidae) from the Oriental region. Volume 15, Issue 1 of *Memoirs of the Zoological Survey of India, Zoological Survey of India*. Manager of Publications, Civil Lines. 81pp.
- Chhotani O.B. and Ferry B. (1995) New termites (Isoptera: Termitidae) from southern India. *Annals of Entomology (Dehradun)* 13: 21–24.
- Chhotani O.B. (1997) The fauna of India and the adjacent countries Isoptera (Termites) Vol. II. Zoological Survey of India, Calcutta. p. 801.
- Evans T.A., Dawes T.Z., Ward P.R. and Lo N. (2011) Ants and termites increase crop yield in a dry climate. *Nature Communications* 2: 262.
- Harit A.K., Ramasamy E.V., Babu N., Rajasree M.J., Monsy P., Bottinelli N. and Jouquet P. (2021) Are wood-feeding and fungus-growing termites so different? Comparison of the organization and properties of *Microcerotermes pakistanicus* and *Odontotermes obesus* soil constructions in the Western Ghats, India. *Insectes Sociaux* 68: 207–216.
- Holmgren K. and Holmgren N. (Fletcher T.B., trans.) (1917) Report on a collection of termites from India. *Memoirs of the Department of Agriculture in India* 5: 135–171.

- Ipe C. and Mathew J. (2019) New species of termite *Ceylonitermes paulosus* sp. nov. (Blattodea: Isoptera: Termitidae: Nasutitermitinae) from Kerala, India. *Journal of Insect Biodiversity* 11: 24–30.
- Ipe C., Amina P., Joseph E., Vijayan S. and Mathew J. (2020) New species of termite *Pseudocapritermes kunjepu* Mathew sp. nov. (Blattodea: Termitidae: Termitinae) from India. *Journal of Insect Biodiversity* 19: 1–7.
- Joseph E., Albright B., Francis A.A., Jayan N. and Mathew J. (2023) First record of *Microcerotermes lahorensis* Akhtar (Blattodea, Isoptera, Termitidae) from India. *ENTOMON* 48: 141–144
- Joseph E., Amina P., Thomas B.S.S., Jayan N. and Mathew J. (2023a) A new species of termite, *Prorhinotermes cotym* (Blattodea: Isoptera: Rhinotermitidae: Prorhinotermitinae), from the Kerala part of the Western Ghats, India. *International Journal of Tropical Insect Science* 43: 1733–1740.
- Joseph E., Ipe C., Aravind N.P., Antony S. and Mathew J. (2022) First report of the termite *Glyptotermes ceylonicus* (Blattodea: Isoptera: Kalotermitidae) from India: an example of discontinuous distribution. *Journal of Threatened Taxa* 14: 21290–21295.
- Kalleshwaraswamy C.M., Pavithra H.B., Vidyashree A.S. and Sathisha G.S. (2018) Comparative termite (Isoptera) diversity in three different habitats of Shivamogga District, Karnataka, India. *Journal of Entomological Science* 53: 219–229.
- Kemner N.A. (1926) Some termites from Ceylon. *Bulletin of Entomological Research* 16: 379–392. doi:10.1017/S0007485300028716.
- Krishna K., Grimaldi D.A., Krishna V. and Engel M.S. (2013) Treatise on the Isoptera of the world. *Bulletin of the American Museum of Natural History* 377: 1–2704.
- Maitii P.K. (2006) A taxonomic monograph on the world species of termites of the family Rhinotermitidae (Isoptera: Insecta). *Memoirs of the Zoological Survey of India* 20: 1–272.
- Mathew J. (2015) Checklist and pest status of termites (Order Isoptera): Kerala. *International Journal of Plant, Animal and Environmental Sciences* 5: 151–158.
- Mathew J. and Ipe C. (2018) New species of termite *Pericapritermes travancorensis* sp. nov. (Isoptera: Termitidae: Termitinae) from India. *Journal of Threatened Taxa* 10: 12582–12588.
- Mathur R.N. and Chhotani O.B. (1969) Two new termites of the genera *Coptotermes* Wasmann and *Heterotermes* Froggatt (Rhinotermitidae) from India. *Journal of the Timber Development Association of India* 15: 1–10.
- Mathur R.N. and Sen-Sarma P.K. (1959) Two new termites *Emersonitermes thekadensis* gen. et sp. nov. and *Trinervitermes nigrirostris* sp. nov. from India (Insecta: Isoptera). *Zeitschrift für Angewandte Entomologie* 45: 66–78.
- Mathur R.N. and Thapa R.S. (1962) *Microcapritermes* gen. n. from India (Isoptera: Termitidae: Termitinae). *Indian Forester* 88: 370–375.
- Mathur R.N. and Thapa R.S. (1962a) A new genus of Nasutitermitinae from India (Isoptera, Termitidae). *Indian Forester* 88: 49–52.
- Nair K.S.S. and Varma R.V. (1985) Some ecological aspects of the termite problem in young eucalypt plantations in Kerala, India. *Forest Ecology and Management* 12: 287–303.
- Poovoli A. and Rajmohana K. (2013) First record of *Heterotermes indicola* (Isoptera: Rhinotermitidae) from South India. *Insect Environment* 19: 162–163.
- Rajmohana K., Basak J., Poovoli A., Sengupta R., Baraik B. and Chandra K. (2019) Taxonomy of termites in India: A beginner's manual. ENVIS Centre on Biodiversity (Fauna), Zoological Survey of India, Kolkata.
- Ranjith M. and Kalleshwaraswamy C.M. (2021) Termites (Blattodea: Isoptera) of southern India: current knowledge on distribution and systematic checklist. *Journal of Threatened Taxa* 13: 18598–18613.
- Ranjith M., Kalleshwaraswamy C.M., Meghana K.J. and Santhrupthi B. (2022) A new species of *Ceylonitermellus* Emerson, 1960 (Blattodea: Termitidae: Nasutitermitinae) from India with a key to the genus. *Journal of Asia-Pacific Entomology* 25: 101903.
- Ranjith M., Kalleshwaraswamy C.M., Meghana K.J., Deshmukh S.S., Shivanna B.K., Satish K.M. and Dhananjaya B.C. (2023) New records of *Euhamitermes* Holmgren from South India. *Indian Journal of Entomology* 79: 348–353.
- Rao N.A., Samatha C. and Sammaiah C. (2012) Biodiversity of termites in Bhadrachalam forest region, Khammam District, Andhra Pradesh.

- Journal of Biodiversity 3: 55–59.
- Roonwal M.L. and Verma S.C. (1972) A new wood-infesting termite of genus *Neotermes* (Isoptera: Kalotermitidae) from India. Proceedings of the National Academy of Sciences, India.
- Roonwal M.L. and Chhotani O.B. (1989) The fauna of India and the adjacent countries Isoptera (Termites) Vol. 1. Zoological Survey of India, Calcutta. 672pp.
- Roonwal M.L. and Verma S.C. (1971) A new termite of genus *Postelectrotermes* (Isoptera: Kalotermitidae) from India, with the distribution of and keys to oriental species. Indian Zoologist 2: 83–91.
- Shanbhag R.R. and Sundararaj R. (2013) Imported wood decomposition by termites in different agro-eco zones of India. International Biodeterioration and Biodegradation 85: 16–22.
- Silvestri F. (1922) Descriptions of some Indo-Malayan species of *Capritermes* (Termitidae). Records of the Indian Museum 24: 535–546.
- Snyder T.E. (1933) Two new termites from India. Proceedings of the Biological Society of Washington 46: 91–93.
- Snyder T.E. (1933a) New termites from India. Proceedings of the United States National Museum 82: 1–15.
- Snyder T.E. (1934) New termites from India. Indian Forest Records, Entomology 20: 1–28.
- Thakur M.L. (1976) First record of occurrence of termite genus *Ceylonitermes* Holmgren, from India, with a new species from Kerala (Isoptera: Termitidae: Nasutitermitinae). Journal of the Timber Development Association of India 22: 15–17.
- Thakur M.L. (1976a) A new nasute termite from South India (Isoptera: Termitidae: Nasutitermitinae). Journal of the Bombay Natural History Society 72: 781–785.
- Thakur M.L. (1978) A new species of termite genus *Neotermes* Holmgren (Isoptera: Kalotermitidae) from Kerala, South India. Journal of the Indian Academy of Wood Science (India).
- Thakur M.L. (1981) Revision of the termite genus *Odontotermes* Holmgren (Isoptera: Termitidae: Macrotermitinae) from India. Indian Forest Records, Entomology 14: 1–183.
- Varma R.V. and Swaran P.R. (2007) Diversity of termites in a young eucalypt plantation in the tropical forests of Kerala, India. International Journal of Tropical Insect Science 27: 95–101.
- Velayuthan S., Kallelshwaraswamy C.M., Thangavelu M., Kulandaivel S. and Palanisamy K. (2022) Diversity of termite species and their distribution in various habitats in Palakkad district, Kerala. Indian Journal of Ecology 49: 780–784.
- Verma S.C. (1984) On a collection of termites (Insecta: Isoptera) from Kerala (India) with a new species of and keys to the Indian species of *Angulitermes* Sjöstedt. Records of the Zoological Survey of India 81: 237–254.
- Verma S.C. (1983) A new species of the termite genus *Pericapritermes* Silvestri (Termitidae: Termitinae) from Kerala, India, with distributions and keys to oriental species of the genus. Indian Journal of Forestry 6: 296–301.
- Verma S.C. (1985) A new species of termite genus *Dicuspiditermes* Krishna (Termitidae: Termitinae) from Kerala, India with the distribution of the known species of the genus. Annals of Entomology (Dehra Dun) 3: 7–11.
- Vidyashree A.S. and Kallelshwaraswamy C.M. (2018) Termites (Isoptera) fauna in Western Ghats, India. Agric International 5: 20–23.
- Wasmann E. (1896) Viaggio di Leonardo Fea in Birmania e regioni vicine LXXII. Neue Termitophilen und Termitenaus Indien. I–III. Annali del Museo Civico di Storia Naturale di Genova 16: 613–630.