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BIODIVERSITY OF TERMITES IN TELANGANA STATE, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Termites play a key role in tropical and subtropical forest ecosystems as decomposers of the largest part of dead organic matter, playing a significant role in soil formation. Termites are polymorphic, eusocial insects, living in large communities of several hundred to millions of individuals, composed of reproductive forms together with numerous apterous sterile soldiers and workers there are about 2933 species of termites in 282 genera, 9 families that have been described so far in the world. They have widely dispersed as well as some temperate regions. India has high diversity with 295 species, 52 genera, 6 families. In Telangana 16 Species, 7 genera and 2 families of termites are already reported. The study was conducted in 5 places in Telangana state to investigate the termite's species diversity. Termites were sampled with a standard 100×2 straight belt transect at 5 different places in Telangana state. 11 Species were collected from different parts of the plants, on dead wood, litter, dead tree stumps and leaf litter, logs and living trees.

Keywords: Termites; polymorphic; eusocial; apterous.

1. INTRODUCTION

Termites are eusocial insects related to cockroaches [1]. They show a complex division of labour within each colony, usually with reproductive (alates), soldier, and worker castes [2]. They are also named ecosystem engineers [3]. Termites play an important role in decomposers [4] and carbon-nitrogen balancer in the tropical terrestrial ecosystems of which they are

a biotic constituent [5]. Being decomposers and recyclers, they are also ecologically important [6]. Termite diversity generally declines with increased elevation like temperature, which is an important factor for termites. Various termites functional groups respond differently to temperature, due to their different feeding habits [7,8]. Krishna et al. (2013) estimated about 2933 species in the world [9]. India has a high diversity of approximately 295 species, 52

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genera, 6 families [9,10]. In South India Konig (1779) has started the first scientific work on termites [11]. Bose (1984) has reported 95 species from southern India [12]. In Telangana 16 species, 7 genera and 2 families of termites are reported [13,14]. An attempt, therefore, to deal with the diversity of termites was made from June 2018 to December 2020 at 5 different places in Telangana State.

1.1 Study Area

Telangana is situated on the Deccan Plateau, in the central stretch of the eastern seaboard of the Indian Peninsula.It covers 112,077 square kilometres (43,273 sq mi) [15]. It consists thick forest area with 26904 km² [16]. Annual rainfall is between 900-1500mm in North Telangana and 700-900mm in South Telangana. In summer average of 42°C and in winter, 22-23°C temperature is recorded. Five (5) places (Hyderabad, Tadvai, Medaram, Warangal, Nadigudem) were selected in Telangana state and study has been done in five places.

2. MATERIALS AND METHODS

The standardized transect method of Jones and Eggleton (2000) was used for sampling termites. A belt transect (2x100m) was laid in each forest zone. Each transect was divided into 20 (2x5m) sections and each section thoroughly searched for termites [17]. Within each section the following microhabitats were searched, surface soil, leaf litter and humus on the forest floor, inside dead logs, tree stumps, branches, twigs subterranean nests, mounds, earthen sheets and

runways on trees up to a height of 3m above ground. Mainly soldier and worker castes were collected from the different microhabitats. In addition to sampling, random collections of termites were collected in several areas within the five selected places. Termite specimens collected for identification were stored in 80% Ethyl alcohol (Ethanol).



Fig. 1. Study area

3. RESULTS

A total of 11 termite species were collected in different habitats of the study area. They are belonging to six genera and two families viz., Termitidae and Rhinotermitidae (Table 1).

Family	Subfamily	Name of the species				
Termitidae	Macrotermitinae	Odontotermes brunneus (Hagen)				
		Odontotermes feae (Wasmann)				
		Odontotermes guptai (Roonwal and Bose)				
		Odontotermes obesus (Rambur)				
		Odontotermes redemanni (Wasmann)				
		Odontotermes wallonensis (Wasmann)				
		Macrotermes convulsionarius (Konig)				
		Microtermes obesi (Holmgren)				
	Termitinae	Microcerotermes beesoni (Snyder)				
Rhinotermitidae	Coptotermitinae	Coptotermes hemi (Wasmann)				
	Heterotermitinae	Heterotermes indicola (Wasmann)				

Table 1. Diversity of termite species recorded at five selected areas in Telangana State

Species											
Place	O.brunneus	O.feae	O.guptai	O.obesus	O.redemanni	O.wallonensis	M.convulsionarius	M.obesi	M.beesoni	C.hemi	H.indicola
warangal						*	*				
Tadvai	*	*		*	*			*	*	*	*
Medaram	*	*		*		*		*	*	*	*
Hyderabad	*			*							
Nadigudem			*								

Table 2. Diversity of termite species recorded at five selected areas in Telangana State

* Denotes species is present

4. DISCUSSION

Termites fauna of the world is estimated to be around 2933 species distributed over 9 extant families and 282 genera [9]. Indian termites fauna share a very small portion of the global fauna. 295 species under 52 genera are known in India [9,18,19,20,21,22]. Detailed studies about the abundance of different species of termites in different habitats have not been carried out. The termites of the genus Macrotermes were found at Kakatiya University in Warangal. C. hemi and H. indicola were found in Tadvai and Madaram. O. brunneus were found at Osmania University in Hyderabad and Tadvai. O. feae were found in Tadvai and, Medaram. O. guptai were found at nadigudem in Suryapet Dist. O. obesus were found in Tadvai, Medaram and Osmania University (Hyderabad). M. obesi and M. beesoni were found in Tadvai and Medaram.

5. CONCLUSION

Eleven (11) termite species were observed and identified, which are belong to 6 genera of 2 families.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

- Eggleton P. Termites and trees: A review of recent advances in termite phylogenetics. Insectes Sociaux. 2001;48:187–193.
- Roisin Y. Diversity and evolution of caste patterns. Termites: Evolution, Sociality, Symbioses, Ecology. (eds T. Abe, D. E. Bignell & M. Higashi). Kluwer Academic Publishers, Dordrecht, The Netherlands. 2000;95–120.
- Jones CG, Lawton JH, Shachak M. Organisms as ecosystem engineers. Oikos. 1994;69:373-386.
- 4. Matsumoto T, Abe T. The role of termites in an equatorial rain forest ecosystem of West Malaysia. Oecologia. 1979;38:261–274.
- Higashi Masahiko, Abe, Takuya and Burns Thomas P. Carbon—nitrogen balance and termite ecology Proc. R. Soc. Lond. B. 1992; 249:303–308.
- Wood TG, Sands WA. The role of termites in ecosystems. In: Brian, M.V. (ed.). Production Ecology of Ants and Termites. Cambridge University Press, Cambridge, xvii+[1]+409pp. 1978;245–292.

- Davies RGP, Eggleton DT, Jones F, Gathorne-Hardy J, Hernandez LM. Evolution of termites functional diversity analysis and synthesis of local ecological and regional influences on local species richness. J Biogeogr. 2003;30: 847-877.
- Inoue T, Takematsu Y, Yamada A, et al. Diversity and abundance of termites along an altitudinal gradient in Khao Kitchagoot National Park, Thailand. J Trop Ecol. 2006;22: 609-612.
- Krishna K, Grimaldi DA, Krishna V, Engel MS. Treatise on the Isoptera of the World: Vol. 1-6. Bulletin of the American Museum of Natural History. 2013;377(1–7):1–2433.
- Rajmohana K, Basak J, Poovoli A, Sengupta R, Baraik B, Chandra K. Taxonomy of Termites in India: A Beginner's Manual. ENVIS Centre on Biodiversity (Fauna), Zoological Survey of India, Kolkata. 2019;77.
- König JG. Naturgeschichte der sogenannten weissen Ameise. Beschäftigungen der Berlinischen Gesellschaft Naturforschender Freunde. 1779;4:1–28.
- Bose G. Termite fauna of Southern India. Records of the Zoological Survey of India. 1984;49:1–270.
- Rao AN, Samantha C, Sammaiah C. Biodiversity of Termites in Bhadrachalam Forest Region, Khammam District, Andhra Pradesh. J. Biodiversity. 2012;3(1):55-59.
- Sengupta R, Baraik B, Basak J, Rajmohana K. Current status of faunal diversity in Telangana:
 1- 394 (Published by the Director, Zool. Surv. India, Kolkata). 2021;Chapter 25:167-168.
- "Telangana Statistics". Telangana state portal. Archived from the original on 5 December 2015. Retrieved 14 December 2015.
- 16. Indian State of Forest Report (ISFR), a biennial report brought out by Dehradun-based Forest Survey of India; 2019.
- 17. Jones DT, Eggleton P. Sampling termites assemblage in tropical forests: Testing a rapid biodiversity assessment protocol. J Appl Ecol. 2000;37:191-203.
- 18. Thakur RK, Tyagi V, Kumar S. Termites from Garhwal, Uttarakhand. (Insecta : Isoptera), with new distributional records. Forest Entomology Division, Forest Research Institute, Dehra Dun, (Uttarakhand). Indian Forester. 2010;621-634.
- Thakur RK, Tyagi V, Kumar S. Macrotermes vikaspurensis, (Isoptera: Termitidae, Macrotermitinae)-A new species from India. Forest Entomology Division, Forest Research

Institute, Dehra Dun. Journal of Experimental Zoology India. 2011a;14(2):667-672.

- 20. Thakur RK, Tyagi V, Kumar S. Neotermes sensarmai, a new species from India (Oriental Region) (Isoptera: Kalotermitidae). Uttar Pradesh Journal of Zoology. 2011b;31(1):101-105.
- 21. Amina P, Rajmohana K. First record of the genus Ceylonitermellus Emerson (Isoptera:

Termitidae: Nasutitermitinae) in southern India, based on a new mainland species from the Kerala ghats. Colemania. 2013;39:1-10.

22. Amina P, Rajmohana K. *Glyptotermes chiraharitae* n. sp., a new damp wood termite species (Isoptera: Kalotermitidae) from India. Zoosystema. 2016;38(3):309-316.

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