

Distribution and Diversity of Ants (Hymenoptera: Formicidae) From Bhokardan, (Ms), India

B. V. Sonune

Department of Zoology Moreshwar Arts, Science and Commerce College Bhokardan Tq.
Bhokardan Dist. Jalna - 431114 (India)
email-bvsonune@gmail.com

Abstract

During the preset study ant were collected from different localities from Bhokardan, Jalna district of Maharashtra from August 2023 to May 2024. Most of the ant species are found in agricultural and grass land and forest habitats as compare to human habitat. All the collected ant samples were represents to super family Formicidae of order Hymenoptera, eleven different species belongs to family Formicidae under four subfamilies and eight genera. Out of which majority of species in subfamily Myrmicinae represents subfamily Formicinae followed by subfamily Ponerinae and subfamily Dolichoderinae The genus represent numbers of species are like Camponotus (3), Crematogaster (1), Monomorium (2), Leptogensys (2), Myrmicaria (1), Oecophylla (1), Paratrechina (1), and Tapinoma (1) respectively. Ants are playing important ecological role in ecosystem.

Key words : Hymenoptera, Formicidae, Ants, Bhokardan, habitats.

Ants belong to the order Hymenoptera with class insecta, which is highly diversified group and witnesses well organized social life among all the insects. The division of labour in ants is one of the pivotal forces responsible for their ecological success. They are important for every terrestrial biome. There are about 15000 species of ants described globally so far which are grouped into 196 genera and 16 subfamilies within family formicidae^{9,11}. Ants are eusocial insects grouped into a single family (Formicidae), which in turn is classified into 17 subfamilies and 334 genera¹². Ants occur

in great diversity and abundance in most ecosystems¹⁴. In view of this, ants are extremely important ecologically and are key participants in many ecosystem processes²⁰. In addition, these insects are also good indicators of environmental conservation status, since they are very sensitive to environmental stress^{24,28}. Ants known as ecosystem engineers because they play very important role by improving soil quality and helps in decomposition process³⁰. Many species of ants provide ecosystem provisioning services such as food and medicine, Formicidae also utilized in entomo therapy or

as alternate medicine in many regions of the world. Ants have well developed immunity system and anti-microbial chemicals used by ants for defence against pathogen which can be used for the treatment of human diseases. This taxon has potential for providing future benefits to mankind as a source of pharmaceuticals to increasing world population²³. Ants make their nests in or under cracks in pavements or other obscure sites and interconnected by underground passages over area. As they are social insects perform a variety of nest keeping tasks. Some ants produce short sounds by. Which are unable to listen for humans¹⁵. Ants are excellent candidates for biodiversity studies because of their high richness, numerical dominance, a good taxonomic base, ease of collection, stationary nesting habits that allow them to be resampled over time, sensitivity to environmental change, and interactions with other organisms¹. Ants are often categorized into functional groups. A functional group allows predictability in the ant's reaction to stress and disturbance²². Seven functional groups have been identified on restored mine sites in Australia^{2,4,5} and parallel studies have been conducted in Arizona³. Family formicidae belongs to the superfamily Vespoidea of order Hymenoptera. India has a rich diversity of ants and about 652 species of ants have been reported from India. A vast number of ant species remains to be discovered while there is already incredibly high number of described species. Ants are found in every ecological zone except Iceland, Greenland and Antarctica¹⁸.

The ant samples were collected from various localities and around Bhokardan tahsil Jalna District of Maharashtra India. Three

ecological habitats, agriculture, grassland forest and human habitat were chosen for sampling. We employed all out search method for the collection of ants from February August 2023 to May 2024. Ants were hand collected using a brush and forceps during daytime from 8am to 4 pm twice every month and preserved in 70 % alcohol at the Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University Chhatrapati Sambhajinagar. Identification of ant species made with the help of stereo zoom trinocular microscope, on the basis of taxonomic keys given by Bolton,^{9,18,21,26} etc. With careful notes of their locality, habitat and relative visual abundance, ant species were listed and each species was counted to calculate and compared the composition, richness, and species diversity indices, among the four different habitat types.

We employed all out search method for the collection of ants in October 2018 to December 2018. Ants were collected using a brush and forceps during day time in between 11am to 2 pm twice in every month. Ant's species were preserved in 70% ethanol in plastic vials at the Department of Zoology, Moreswar Arts, science and Commerce College. The stored ant specimens were then counted and identified up to genus level (some to species level) using microscope. Species identification was carried out under the help of the keys of "Ants identification guide" Bolton¹¹ collected ants were identified up to the genus level by using based on literature Sheela S. and Chattopadhyay (2012) A, and 14]. Identified specimens will be kept in the air tight insect wooden box. Ant species, Gadagkar *et al.*¹⁷ Agosti *et al.*¹. Shriram N. Ghait, G. B. Kale ((2015)). Were listed and

each species was counted to calculate and compared composition, richness, species diversity, trees association, habitat type and identification of ants.

Collection and Identification :

Ants were collected manually by using brush and forceps during day time, generally morning and evening was best time for collection suggested by Sheela S. and Chattopadhyay A. (2012). Gadagakar *et al.*¹⁷. Ants were hidden in their nests or tunnels so it is difficult to collect them, for collection of hidden ant specimens using the bait method suggested by Shriram²⁷. The collected specimens of the ants were transferred into vials containing 70% ethyl alcohol. There were separate vials used for each specimen. Then all the specimens were brought the laboratory for identification and preservation. Identification of ant species made with the help of stereo zoom trinocular microscope on the basis of taxonomic keys of

Bolton⁹ (1994), Bingham⁸ (1903), Mathew and R.N. Tiwari²¹, Lee and Tan.,¹⁹ Sheela²⁵ Sheela and Ghosh²⁶.

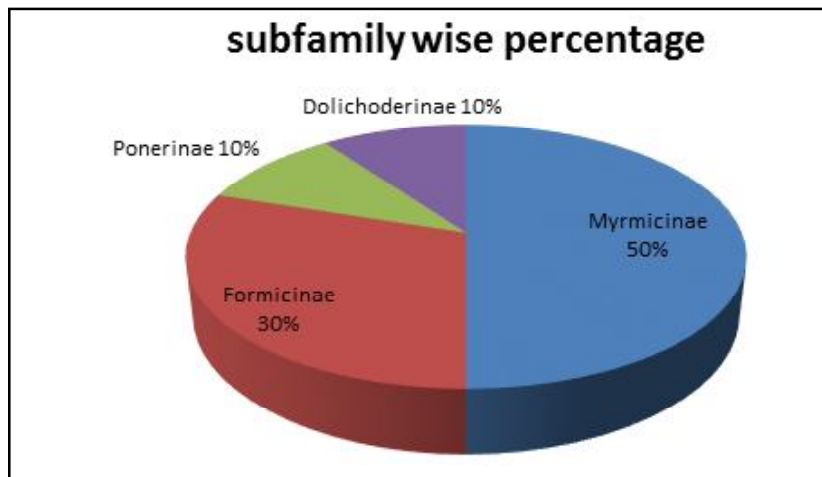
The present investigation shows that there are 11 species of ants belonging 08 genera and four subfamilies. The species encountered in the study area include *Crematogaster subnuda*, *Monomorium indicum*, *Monomorium latinode*, and *Myrmicaria brunnea*, belonging to subfamily Myrmicinae. Subfamily Formicinae was represented by species like *Camponotus compressus*, *Oecophylla smaragdina*, *Paratrechina longicornis*, *Camponotus anguisticolis*, *Camponotus* species. Subfamily Ponerinae and Dolichoderinae was representing with single species that is *Leptogenys diminuta* and *Tapinomamelano cephalum*. But with this we applied Shanon weiner diversity indices for this which shows that 2.22 Agriculture site, 2.74 at grassland site, 2.76 at forest and 2.12 at human habitat.

Table-1. Diversity of Ants (Hymenoptera: Formicidae) from Bhokardan tahsil

Family	Subfamily	Genus	Species
Formicidae	Formicinae	<i>Camponotus</i>	<i>Camponotus compressus</i> (Fabricius 1787)
			<i>Camponotus anguisticolis</i> (Jerdon, 1851)
			<i>Camponotus</i> species.
		<i>Oecophylla</i>	<i>Oecophyllas smragdina</i> (Fabricius, 1775)
		<i>Paratrechina</i>	<i>Paratrechina longicornis</i> (Latreille, 1802)
	Ponerinae	<i>Leptogenys</i>	<i>Leptogenys diminuta</i> (Smith, 1857)
	Dolichoderinae	<i>Tapinoma</i>	<i>Tapinomamelano cephalum</i> (Fabricius, 1793)
	Myrmicinae	<i>Monomorium</i>	<i>Monomorium indicum</i> (Forel, 1902)
			<i>Monomorium latinode</i> (Mayr, 1872)
		<i>Myrmicaria</i>	<i>Myrmicaria brunnea</i> (Saunders,1841)
<i>Crematogaster</i>		<i>Crematogaster subnuda</i> (Mayr, 1879)	

Table-2. Distribution of ant species in different habitats from Bhokardan

Ant Species	Ants distribution			
	A	B	C	D
<i>Camponotus compressus</i> (Fabricius 1787)	+	+	+	+
<i>Camponotus angusticolis</i> (Forel)	+	+	+	+
<i>Oceophyllas smragdina</i> (Fabricius, 1775)	-	-	-	+
<i>Camponotud species.</i>	+	+	+	+
<i>Paratrechina longicornis</i> (Latreille, 1802)	+	+	+	+
<i>Leptogenys diminuta</i> (Smith, 1857)	+	+	+	+
<i>Tapinomamelano cephalum</i> (Fabricius, 1793)	+	+	-	-
<i>Monomorium indicum</i> (Forel, 1902)	+	+	-	-
<i>Monomorium latinode</i> (Mayr, 1872)	-	+	+	-
<i>Myrmicaria brunnea</i> (Saunders,1841)	+	+	+	-
<i>Crematogaster subnuda</i> (Mayr, 1879)	+	+	+	+



References :

1. Agosti, D., J. D. Majer, L. E. Alonso, and T. R. Schultz. (2000). Ants standard methods for measuring and monitoring biodiversity, Smithsonian Institution Press, Washington D.C. 280 pp.
2. Andersen, A. N. (1995). *Journal of Biogeography* 22:15-29.
3. Anderson, A. N. (1997). *Journal of Biogeography* 24(4): 433-460.
4. Andersen, A. N. (2000). A global ecology of rainforest ants: functional groups in relation to environmental stress and disturbance Pages 25-34 in
5. Andersen, A. N. and J. D. Majer. (2004). *Frontiers in Ecology and the Environment* 2(6): 291-298.

6. Bayer. (2010). An ant identification guide, Bayer environmental science,
7. Bhandari, R., A.H. Sheikh and M. Thomas (2017). *Nat. J. Multidisc. Res. Develop.*, 2: 244-47.
8. Bingham CT. (1903). The Fauna of British India including Ceylon and Burma Hymenoptera, Ants and Cuckoowasps London Taylor and Francis. 2: 1-506.
9. Bolton, B. (1994). Identification guide to the ant genera of the world. Cambridge, USA, Harvard University Press.
10. Bolton B. (1995). A new general catalogue of the ants of the world. (The world, Cambridge, Mass: Harvard University Press, 11-504.
11. Bolton, B. (2003). *Memoirs of the American, Ent Instt.*, 71: 1-370.
12. Bolton, B. (2019). An online catalog of the ants of the world. Available at: <http://antcat.org>. Access in: 06/09/2019.
13. Chavhan A, and S.S. Pawar (2011). *World Journal of Zoology*: 6(4): 395-400.
14. Choe, J. (2012). Secret Lives of Ants. Baltimore, Johns Hopkins University Press. 184p. illus.
15. Esperson JR. (1994). *Australian Journal of Entomology*. 33(3): 213-215.
16. Folgarait, P. J. (1998). *Biodiversity and Conservation* 7: 1221–1244.
17. Gadagkar Raghvendra, Padmini Nair, K Chandrasekhara, and DM. Bhat (1993). *Hexapoda*, 5: 79-94.
18. Holldobler B, and EO. Wilson (1990) The Ants. Harvard University Press. Cambridge, U.S.A.
19. Lee, C.Y. and E. Tan, Guide to Urban Pest Ants of Singapore, pp: 40.
20. Lemanceau, P. and M. Blouin, (2018). Soil as a key component of the critical zone 6: Ecology. London, Wiley, ISTE. 196p.
21. Mathew R, and RN. Tiwari, (2000). Insecta: Hymenoptera: Formicidae. *Zool. Surv. India Fauna of Meghalaya, State Fauna Series*, 4.
22. Phillips, N. (2006). *Water and Atmosphere* 14(1): 22-23.
23. Rastogi N. (2011). *Asian Myrmecology*. 4(1): 103-120.
24. Ribas, C.R., R.B.F. Campos, F.A. Schimidt and R.C.C. Solar, (2012). *Psyche*, 2012: 1–23.
25. Sheela S. (2008). Handbook on Hymenoptera: Formicidae. *Zoological Survey of India*.
26. Sheela, S., and S. N. Ghosh, (2008). *Biosystematica* 2(2): 17-20.
27. Shriram N. Ghait, and G. B. Kale, (2015). *Int. J. of Scientific and technology research*, 4(11): 62-65.
28. Silvestre, R., C.R.F. Brandão, and R.R. Silva, (2003). *Grupos funcionales de hormigas: el caso de los gremios del Cerrado, Brasil. In: Fernández, F.*
29. Sornapriya J. et al. (2019). *International Journal of Creative and Innovative Research In All Studies* Vol. 1 Issue. 9
30. Watanasit S, C Pholphuntin, and S. Permkam (2000). Diversity of ants (Hymenoptera: Formicidae) from Ton Nga Chang Wildlife Sanctuary, Songkhla, Thailand. *Science Asia*. 26: 187-194.