



[Science Archives \(ISSN:2582-6697\)](http://www.sciencearchives.org)

Journal homepage: www.sciencearchives.org



<http://dx.doi.org/10.47587/SA.2022.3201>



Research Article

An initial checklist of the ants (Hymenoptera: Formicidae) and their specific distribution from district Wardha, Maharashtra, India

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Received: Mar 20, 2022/ Revised: Apr 15, 2022 / Accepted: Apr 20, 2022

Abstract

Biodiversity of life forms is incredible in India. In the present study, the comprehensive list of ant species and their distribution in district wardha from 2019 to 2021 have been studied. The habitat selected to study the impressive diversity of ants is agricultural field, domestic habitats, tree plantations, and surrounding water bodies. This is the first checklist of ant recorded in eight tehsil places (Seloo, Wardha, Deoli, Arvi, Ashti, Karanja, Hinganghat, Samudrapur) of district Wardha. The total ant species recorded belong to six subfamilies i.e. Formicinae, Myrmicinae, Ponerinae, Dorylinae, Dolichoderinae, and Pseudomyrmecinae. A total of 57 species belonging to the 30 genera are listed in the district. The species diversity index is more in agricultural fields followed by domestic habitats. The generic richness recorded for *Componotus* and *Crematogaster*.

Keywords Ants, Checklist, Distribution, Habitat, Wardha.

Introduction

The Vidarbha region is well known for its varied habitat and niche, seasonal environment, and interesting biodiversity. Wardha district is part of vidarbha. The ant behaviour is eusocial (Gadagkar et al., 1993). Ants are cosmopolitan, an important part of animal biomass, and present at almost all levels of the terrestrial food web (Holldobler and Wilson 1990; Andersen, 1997; Pfeiffer et al., 2013). There are 12 known subfamilies of Indian ants i.e. Dolichoderinae, Dorylinae, Myrmicinae, Ponerinae, Formicinae, Pseudomyrmecinae, Aenictinae, Amblyoponinae, Cerapachyinae, Ectatomminae, Proceratiinae, and Leptanillinae. With predatory behavior, ants also perform the role of scavengers, pollinators, and nutrient cyclers (Del et al., 2012; Guenard 2013) and contribute to the dispersal behavior of plants (Lach et al., 2010).

The first checklist of Indian ants was published by Chapman and Capco, (1951). However, Jerdon (1851, 1854) published the catalog of Southern Indian ants. His list was extended by

Forel (1900, 1901) and added 267 species to the previous list. The latter compilation of the checklist was done and recorded 652 valid species (Bharti, H. 2011). The diversity of Indian ants and their state-wise distribution is given and recorded in 828 species and 100 genera grouped in 10 subfamilies (Bharti et al., 2016). However, number of species for invertebrate groups have to be documented in catalogue. Distribution of ant species in and around Amravati city of Maharashtra recorded 34 species in 20 genera (Chavan and Pawar, 2011). Distribution of ant fauna in and around Nagpur city, Maharashtra recorded 25 genera belonging to five subfamilies (Meshram et al., 2015). Distribution and diversity of ants around Gautala Autramghat Sanctuary, Aurangabad Maharashtra recorded total of 17 species of ants belonging to 13 genera and 6 subfamilies (Sonune and Chavan, 2016).

In the present study, the initial list of ants, for the first time from the district wardha has been recorded. This taxonomic effort can help to understand the further behavioural study of ants.

Materials and Methods

Study area and habitat

Wardha district is in the state of Maharashtra in India. The geographical location of district wardha is 20.8049° N, 78.5661° E. The species listed were collected from eight tehsil places i.e. Seloo, Wardha, Deoli, Arvi, Ashti, Karanja, Hinganghat, Samudrapur (Fig.1). The habitat selected for collection of ants, the agricultural field, domestic habitat, grassland, tree plantation, and surrounding water bodies. The survey for the collection of ants has been started from 2019 to 2021. We have used all situational and possible methods for the collection of ants but specifically, ants were hand collected by using forceps and brushes.



Fig.1 Geographical position of eight tehsil places in district wardha considered in this study

Ant Identification

Ants preserved in 70% ethyl alcohol at the Department of Zoology, Dr. R. G. Bhojar arts, commerce and science college seloo, dist. Wardha. The ant's species were listed with their specific distribution. The ants were identified up to the genus level by using the stereoscopic binocular microscope (Carl Zeiss stemi DV4) and identification key Bolton, (1994). Species name spelling, validity, and authority confirm to Bharti et al., (2016) checklist of the ants of the India (Appendix 1).

Result and Discussion

Species richness

From the district Wardha, Maharashtra, India distributional data from the eight tehsil places (Seloo, Wardha, Deoli, Arvi, Ashti, Karanja, Hinganghat, Samudrapur), 57 species listed, representing 30 genera grouped in 6 subfamilies. The species

richness for the subfamily Myrmicinae is the higher (21 species, 36.84%), followed by Formicinae (17 species, 29.82%), Ponerinae (10 species, 17.54%), Dolichoderinae (5 species, 8.7%), Dorylinae (2 species, 3.5%) and Pseudomyrmecinae 2 species representing single genera. Like the species richness, the generic richness of Myrmicinae is higher (36.66%) followed by Formicinae and Ponerinae (20%) (Fig.2, Table 1).

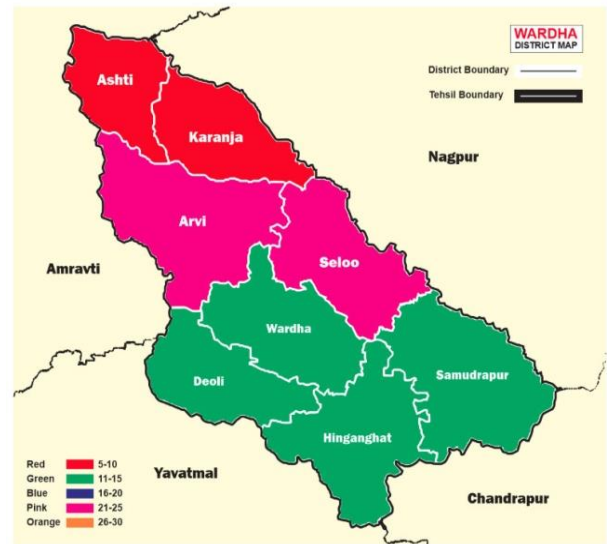


Fig.2 (A) Generic Richness

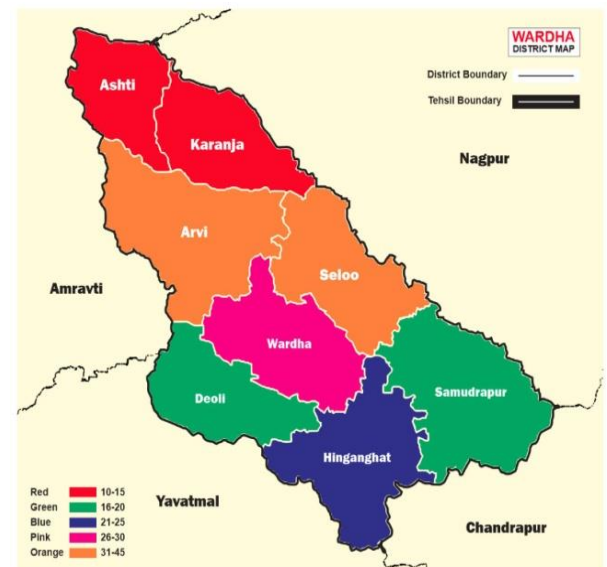


Fig.2 (B) Species Richness of eight tehsil places in district wardha considered in this study

Table 1. List of Genus and species from district wardha

Subfamily	Genus	Species
Dolichoderinae	<i>Iridomyrmex</i>	<i>anceps</i> (Roger, 1863)
	<i>Tapinoma</i>	<i>indicum</i> (Forel, 1895)
		<i>Melanocephalum</i> (Fabricius, 1793)
	<i>Technomyrmex</i>	<i>albipes</i> (Smith, 1861)
<i>brunneus</i> (Forel, 1895)		
	<i>Dolichoderus</i>	<i>spp.</i>
Dorylinae	<i>Dorylus</i>	<i>orientalis</i> (Westwood, 1835)
	<i>Cerapachys</i>	<i>longitarsus</i> (Mayr, 1879)
Formicinae	<i>Camponotus</i>	<i>angusticollis</i> (Jerdon, 1851)
		<i>barbatus taylori</i> (Forel, 1892)
		<i>compressus</i> (Fabricius, 1787)
		<i>dolendus</i> (Forel, 1892)
		<i>irritans</i> (Smith, 1857)
		<i>rufoglaucus</i> (Jerdon, 1851)
		<i>sericeus</i> (Fabricius, 1798)
		<i>variegatus</i> (Smith, 1858)
	<i>Lepisiota</i>	<i>bipartita</i> (Smith, 1861)
		<i>frauenfeldi</i> (Mayr, 1855)
		<i>sericea</i> (Forel, 1892)
	<i>Oecophylla</i>	<i>smaragdina</i> (Fabricius, 1775)
	<i>Paratrechina</i>	<i>longicornis</i> (Latreille, 1802)
	<i>Plagiolepis</i>	<i>jerdonii</i> (Forel, 1894)
	<i>Polyrhachis</i>	<i>exercita obtusisquama</i> (Forel, 1902)
<i>lacteipennis</i> (Smith, 1858)		
<i>rastellata</i> (Latreille, 1802)		
Myrmicinae	<i>Aphaenogaster</i>	<i>beccarii</i> (Emery, 1887)
	<i>Cardiocondyla</i>	<i>carbonaria</i> (Forel, 1907)
		<i>wroughtonii</i> (Forel, 1890)
		<i>aberrans</i> (Forel, 1892)
	<i>Crematogaster</i>	<i>rothneyi civa</i> (Forel, 1902)
		<i>ebenina</i> (Forel, 1902)
		<i>wroughtonii</i> (Forel, 1902)
		<i>diffusa</i> (Jerdon, 1851)
		<i>perelegans</i> (Forel, 1902)
		<i>quadrspinus</i> (Jerdon, 1851)
	<i>Lophomyrmex</i>	<i>bicolor</i> (Guerin-Meneville, 1844)
	<i>Meranoplus</i>	<i>instabilis</i> (Smith, 1858)
	<i>Messor</i>	<i>indicum</i> (Forel, 1902)
	<i>Monomorium</i>	<i>indica</i> (Mayr, 1879)
		<i>noda</i> (Smith, 1874)
		<i>parva</i> (Mayr, 1865)
	<i>Solenopsis</i>	<i>geminata</i> (Fabricius, 1804)
	<i>Tetramorium</i>	<i>mayri</i> (Forel, 1912)
	<i>Trichomyrmex</i>	<i>criniceps</i> (Mayr, 1879)
<i>glaber</i> (Andre, 1883)		
<i>wroughtoni</i> (Forel, 1902)		
Ponerinae	<i>Diacamma</i>	<i>ceylonense</i> (Emery, 1897)
		<i>rugosum</i> (Le Guillou, 1842)
	<i>Leptogenys</i>	<i>chinensis</i> (Mayr, 1870)
		<i>diminuta</i> (Smith, 1857)
		<i>processionalis</i> (Jerdon, 1851)
	<i>Platythyrea</i>	<i>sagei</i> (Forel, 1900)
	<i>Odontoponera</i>	<i>denticulata</i> (Smith, 1858)
	<i>Mesoponera</i>	<i>manni</i> (Viehmeyer, 1924)
<i>Brachyponera</i>	<i>jerdonii</i> (Forel, 1900)	
	<i>luteipes</i> (Mayr, 1862)	
Pseudomyrmecinae	<i>Tetraponera</i>	<i>rufonigra</i> (Jerdon, 1851)
		<i>nigra</i> (Jerdon, 1851)
# 6	# 30	# 57

Regional diversity

During the present study, tehsil arvi recorded the highest number of species, 44 species represented 23 genera followed by seloo with 41 species representing 23 genera. In

Hinganghat, recorded 12 genera representing 22 species. In Wardha, Deoli and Samudrapur recorded 11 genera representing 26, 18, and 16 species respectively. In Ashti and Karanja, recorded 6 genera representing 15 species and 9 genera representing 11 species respectively (Table 2).

Table 2. Species diversity per genus within district wardha

		Seloo	Wardha	Deoli	Arvi	Ashti	Karanja	Hinganghat	Samudrapur
Dolichoderinae	<i>Iridomyrmex</i>	1		1	1			1	1
	<i>Tapinoma</i>	2	2	2		2	1		1
	<i>Technomyrmex</i>	1			2	1			
	<i>Dolichoderus</i>	1							
Dorylinae	<i>Dorylus</i>	1			1				
	<i>Cerapachys</i>				1			1	
Formicinae	<i>Camponotus</i>	8	8	7	8	7	2	8	5
	<i>Lepisiota</i>	2	1		3				1
	<i>Oecophylla</i>				1			1	
	<i>Paratrechina</i>	1			1				
	<i>Plagiolepis</i>		1		1			1	
	<i>Polyrhachis</i>	2		2	3		1		1
Myrmicinae	<i>Aphaenogaster</i>	1			1				
	<i>Cardiocondyla</i>	1		1	1			1	
	<i>Crematogaster</i>	5	5	1	5	3	2	4	2
	<i>Lophomyrmex</i>				1				
	<i>Meranoplus</i>	1		1					
	<i>Messor</i>	1	1						1
	<i>Monomorium</i>	1			1				
	<i>Pheidole</i>	2	2		3			1	
	<i>Solenopsis</i>	1	1	1	1	1	1	1	1
	<i>Tetramorium</i>	1		1	1				
	<i>Trichomyrmex</i>	1					1		
Ponerinae	<i>Diacamma</i>		1		2			1	
	<i>Leptogenys</i>	3	2		3		1		1
	<i>Platythyrea</i>				1				
	<i>Odontoponera</i>	1					1		
	<i>Mesoponera</i>	1			1				
	<i>Brachyponera</i>			1				1	1
Pseudomyrmecinae	<i>Tetraoponera</i>	2	2	1	1	1	1	1	1
	#Genus	23	11	11	23	6	9	12	11
	#species	41	26	18	44	15	11	22	16

Selected habitat

During the study, ant fauna was recorded from different sites in district wardha. Three habitats were selected for study including niche of ants i.e. agricultural field, grassland, and domestic habitat. The most common genus found all over district wardha are, *Camponotus*, *Crematogaster*, *Solenopsis*, *Tetraoponera*, *Tapinoma* and *Cardiocondyla*. Among 57 species

listed, 36, 26, and 32 species were collected from agricultural fields, grassland, and domestic habitat respectively. The species listed in abundance and found in all habitats are *Tapinoma indicum*, *Camponotus compressus*, *Camponotus rufoglaucus*, *Cardiocondyla carbonaria*, *Crematogaster wroughtonii*, *Crematogaster aberrans*, *Solenopsis geminata*, *Tetraoponera rufonigra* (Table 3).

Some ants are more common in agricultural field. During the present study it is observed that *Pheidole*, *Oecophylla*, *Solenopsis*, *Crematogaster*, *Camponotus* shows predatory behaviour on pest of crop field. *Tapinoma*, ghost ant are predators and feed on small insects and caterpillar in field. The

generalist ants are biological agent in agricultural cropping systems (Choate and Drummond, 2011). The nest of *Oecophylla smaragdina* hanging on trees and they are aggressive predators. Workers of *Oecophylla* kill silkworm larvae (Gathalkar and Barsagade, 2016).

Table 3. Distribution of ant Species in different habitats in district Wardha

Ants		Habitat		
Genus	Species	AF	GL	DH
<i>Iridomyrmex</i>	<i>anceps</i> (Roger, 1863)	+	-	-
<i>Tapinoma</i>	<i>indicum</i> (Forel, 1895)	+	+	+
<i>Tapinoma</i>	<i>Melanocephalum</i> (Fabricius, 1793)	+	-	-
<i>Technomyrmex</i>	<i>albipes</i> (Smith, 1861)	-	+	+
<i>Technomyrmex</i>	<i>brunneus</i> (Forel, 1895)	-	+	-
<i>Dolichoderus</i>	<i>Spp</i>	+	-	-
<i>Dorylus</i>	<i>orientalis</i> (Westwood, 1835)	-	+	+
<i>Cerapachys</i>	<i>longitarsus</i> (Mayr, 1879)	-	-	-
<i>Camponotus</i>	<i>angusticollis</i> (Jerdon, 1851)	+	-	+
<i>Camponotus</i>	<i>barbatus taylori</i> (Forel, 1892)	+	-	+
<i>Camponotus</i>	<i>compressus</i> (Fabricius, 1787)	+	+	+
<i>Camponotus</i>	<i>dolendus</i> (Forel, 1892)	+	-	+
<i>Camponotus</i>	<i>irritans</i> (Smith, 1857)	+	-	+
<i>Camponotus</i>	<i>rufoglaucus</i> (Jerdon, 1851)	+	+	+
<i>Camponotus</i>	<i>sericeus</i> (Fabricius, 1798)	+	-	+
<i>Camponotus</i>	<i>variegatus</i> (Smith, 1858)	+	+	+
<i>Lepisiota</i>	<i>bipartita</i> (Smith, 1861)	-	-	+
<i>Lepisiota</i>	<i>frauenfeldi</i> (Mayr, 1855)	+	-	-
<i>Lepisiota</i>	<i>sericea</i> (Forel, 1892)	-	-	+
<i>Oecophylla</i>	<i>smaragdina</i> (Fabricius, 1775)	+	-	-
<i>Paratrechina</i>	<i>longicornis</i> (Latreille, 1802)	+	-	-
<i>Plagiolepis</i>	<i>jerdonii</i> (Forel, 1894)	-	+	+
<i>Polyrhachis</i>	<i>exercita obtusisquama</i> (Forel, 1902)	-	+	-
<i>Polyrhachis</i>	<i>lacteipennis</i> (Smith, 1858)	+	-	-
<i>Polyrhachis</i>	<i>rastellata</i> (Latreille, 1802)	-	+	-
<i>Aphaenogaster</i>	<i>beccarii</i> (Emery, 1887)	-	+	-
<i>Cardiocondyla</i>	<i>carbonaria</i> (Forel, 1907)	+	+	+
<i>Crematogaster</i>	<i>wroughtonii</i> (Forel, 1890)	+	+	+
<i>Crematogaster</i>	<i>aberrans</i> (Forel, 1892)	+	+	+
<i>Crematogaster</i>	<i>rothneyi civa</i> (Forel, 1902)	+	-	-
<i>Crematogaster</i>	<i>ebenina</i> (Forel, 1902)	+	-	+
<i>Crematogaster</i>	<i>wroughtonii</i> (Forel, 1902)	-	+	-
<i>Crematogaster</i>	<i>diffusa</i> (Jerdon, 1851)	+	-	-
<i>Crematogaster</i>	<i>perelegans</i> (Forel, 1902)	+	-	-
<i>Lophomyrmex</i>	<i>quadrispinosus</i> (Jerdon, 1851)	-	+	-
<i>Meranoplus</i>	<i>bicolor</i> (Guerin-Meneville, 1844)	-	+	-
<i>Messor</i>	<i>instabilis</i> (Smith, 1858)	+	-	-
<i>Monomorium</i>	<i>indicum</i> (Forel, 1902)	+	-	+
<i>Pheidole</i>	<i>indica</i> (Mayr, 1879)	+	-	+
<i>Pheidole</i>	<i>noda</i> (Smith, 1874)	+	-	-
<i>Pheidole</i>	<i>parva</i> (Mayr, 1865)	-	+	-
<i>Solenopsis</i>	<i>geminata</i> (Fabricius, 1804)	+	+	+
<i>Tetramorium</i>	<i>mayri</i> (Forel, 1912)	-	+	+
<i>Trichomyrmex</i>	<i>criniceps</i> (Mayr, 1879)	+	+	-
<i>Trichomyrmex</i>	<i>glaber</i> (Andre, 1883)	+	-	+
<i>Trichomyrmex</i>	<i>wroughtoni</i> (Forel, 1902)	-	-	+
<i>Diacamma</i>	<i>ceylonense</i> (Emery, 1897)	+	-	+
<i>Diacamma</i>	<i>rugosum</i> (Le Guillou, 1842)	-	+	-
<i>Leptogenys</i>	<i>chinensis</i> (Mayr, 1870)	-	+	+

<i>Leptogenys</i>	<i>diminuta</i> (Smith, 1857)	-	-	+
<i>Leptogenys</i>	<i>processionalis</i> (Jerdon, 1851)	+	-	-
<i>Platythyrea</i>	<i>sagei</i> (Forel, 1900)	+	-	+
<i>Odontoponera</i>	<i>denticulata</i> (Smith, 1858)	-	-	+
<i>Mesoponera</i>	<i>manni</i> (Viehmeyer, 1924)	+	+	-
<i>Brachyponera</i>	<i>jerdonii</i> (Forel, 1900)	-	-	+
<i>Brachyponera</i>	<i>luteipes</i> (Mayr, 1862)	-	+	-
<i>Tetraoponera</i>	<i>rufonigra</i> (Jerdon, 1851)	+	+	+
<i>Tetraoponera</i>	<i>nigra</i> (Jerdon, 1851)	+	-	+
Ant species richness		36	26	32

AF: Agricultural field; GL: Grassland; DH: Domestic Habitat

Conclusion

In the Wardha district, species richness is more in the agricultural field. It is beneficial to human beings to decline the pest population and prevent erosion of soil. Here we encourage to conserve myrmecofauna, as ants are ecologically important in most terrestrial ecosystems. Some regions are undersampled, the data listed here shows regional diversity and distribution in different habitats. Biogeographical picture of ant richness in district Wardha presents here for the first time.

Conflict of Interest

The author hereby declares no conflict of interest.

Acknowledgments

The author is thankful to Dr. S. Kanode Principal, Dr. RGBACS College, Seloo, and Dr. D. D. Barsagade, RTMNU Nagpur for constant encouragement and for providing the necessary lab facilities during the research work.

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How to cite this article

Badwaik, V. J. (2022). An initial checklist of the ants (Hymenoptera: Formicidae) and their specific distribution from District Wardha, Maharashtra, India. *Science Archives*, Vol. 3 (2), 88-93. <http://dx.doi.org/10.47587/SA.2022.3201>

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