

# A Review of Common Ant Species in Karnataka, India: Biodiversity, Taxonomy, Ecology, and Public Health Implications

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## ABSTRACT

India hosts over 800 documented ant species, yet public awareness remains limited to broad generalizations such as “black ants” and “red ants.” This review synthesizes existing data on the most commonly observed ant taxa in India, including native generalists and invasive species, with an emphasis on their ecological roles, behaviours, and relevance to public health and household infestations. Historical and pre literature is reviewed to contextualize species prevalence and adaptive strategies in urban and rural ecosystems.

**Keywords:** Invasive ant species, Native Indian ants, Ant nesting behaviour, Ant foraging ecology, Pheromone communication in ants, Ant-related public health risks

## 1. Introduction

Ants (Family: Formicidae) are ubiquitous in the Indian subcontinent and function as crucial ecosystem engineers. Despite their ecological importance, a large segment of the public associates ants with nuisance or pest behaviour. Misconceptions—such as the conflation of ants and termites—have contributed to underestimation of the diversity and impact of ant species in both domestic and environmental contexts [1]. This article aims to distinguish key Indian ant species, explore their habitat preferences, diets, and implications on human health, particularly in urban settings. The study of ant biodiversity in India has a rich historical foundation. Early taxonomic efforts by [2-3] laid the groundwork by cataloging numerous ant species across the subcontinent. Bingham's seminal volume in *The Fauna of British India* remains a critical reference for hymenopteran taxonomy. Later, [4] revised Indo-Australian *Camponotus* species, refining species identification criteria. A significant modern synthesis was offered by [5], whose global perspective on ant ecology and behaviour remains indispensable. More recent regional surveys, such as those by [6] have documented over 800 valid ant taxa across 100 genera and 10 subfamilies in India, demonstrating both the ecological richness and understudied diversity in various biogeographic zones. Studies by [7] in Maharashtra, and [8] in Kolkata, have revealed notable variations in species composition across urban and sanctuary environments. On the public health and ecological front, ants have been increasingly recognized as bioindicators, as detailed in reviews by many entomologists, which align with [9] work offering diagnostic keys and ecological observations pertinent to both research and policy applications.

## 2. Diversity of Ant Species in India

India is home to at least “828 known ant species” [10] many of which demonstrate regional specificity. While rural households may host up to 15 species, urban homes typically accommodate four or fewer. Commonly encountered species can be categorized as either invaders or native generalists.

### 2.1 Invasive Species

#### Yellow Crazy Ant (*Anoplolepis gracilipes*)

Known for erratic movement and aggressive colony expansion. Displaces native fauna and has been considered among the world's worst invasive species [11].



Figure 1: Morphology of Yellow Crazy Ant

**Ghost Ant (*Tapinoma melanocephalum*):** Tiny, pale-bodied ants that prefer warm, humid indoor environments.



Figure 2: Morphology of Ghost Ant

**Pharaoh Ant (*Monomorium pharaonis*):** A medically significant species often found in hospitals. Queens can produce up to 3,500 eggs in a lifetime, facilitating rapid infestations [12].



Figure 3: Morphology of Pharaoh Ant

**Black Crazy Ant (*Paratrechina longicornis*):** A cosmopolitan species with long legs and antennae, commonly observed in kitchens and domestic spaces.



Figure 4: Morphology of Black Crazy Ant

## 2.2 Native Generalists

**Black Carpenter Ant (*Camponotus compressus*):** Builds nests in decaying wood but does not consume it, unlike termites.



Figure 4: Morphology of Black Carpenter Ant

**Golden-backed Ant (*Camponotus sericeus*):** Notable for its metallic sheen, largely arboreal.



Figure 5: Morphology of Golden-backed Ant

***Myrmicaria brunnea* and *Camponotus angusticollis***  
Typically, localized species, part of a broader assemblage adapted to Indian climatic zones.



Figure 6: Morphology of *Myrmicaria brunnea*



Figure 7: Morphology of *Camponotus angusticollis*

## 3. Ants diversity in Karnataka

Karnataka, with its varied ecosystems—ranging from dry deciduous forests to urban green spaces—hosts a rich assemblage of ant species. Many researchers emphasized that ants in Karnataka are not only taxonomically diverse but also ecologically pivotal, contributing to soil aeration, nutrient cycling, and seed dispersal. Earlier field studies conducted between 2016 and 2018, such as those in Cubbon Park, Bengaluru, revealed that low-disturbance habitats supported higher species richness and abundance, with species like *Camponotus compressus* and *Oecophylla smaragdina* dominating undisturbed zones.

In last decade, study analyzing data from earlier years reported 40 species across 25 genera and six subfamilies in semi-arid regions of Karnataka, with Simpson's diversity index reaching 0.97 in vegetative and human habitats—indicating high ecological complexity. These findings suggest that urban green spaces and vegetative zones act as biodiversity reservoirs, while agricultural and dryland habitats showed reduced diversity

(Simpson index ~0.80), likely due to anthropogenic pressures. From a public health and conservation standpoint, this diversity is significant. Ants serve as bioindicators of environmental health, and their presence or absence can reflect habitat quality, pollution levels, and land-use changes. These data thus underscore the need for landscape-level conservation strategies that integrate ant diversity as a metric for ecosystem integrity.

#### 4. Ecology and Nesting Behaviour

Several Indian ant species display remarkable “colony mobility”, often shifting nests in response to environmental disruption or resource scarcity [12-13]. Nesting habits differ widely:

Moisture-preferring species such as “*Tapinoma sessile*” thrive near plumbing or damp corners.

Soil-nesting ants such as “*Linepithema* spp.”, establish shallow nests under foliage.

Wood-nesting ants such as carpenter ants, are often mistaken for wood-damaging termites, though they do not digest cellulose.

#### 5. Foraging Habits and Diet

Ant diets vary considerably across species, though many are “opportunistic feeders”:

*Monomorium minimum* feeds on sweets and organic debris. *Linepithema humile* (Argentine ant) prefers sugary liquids such as fruit juice or honeydew. *Monomorium pharaonis* and *Paratrechina longicornis* consume proteins including dead insects and meat, relevant for hospital and food facility infestations. Chemical trail communication via “pheromones” enhances foraging efficiency and colony coordination [14].

#### 6. Ants and Public Health Concerns

Certain ant species are known to transmit “pathogens and allergens” by walking over contaminated surfaces before entering kitchens or food storage. Their presence in “hospital settings”—notably ‘Pharaoh ants’—raises concerns due to the potential for mechanical transmission of bacteria [15]. While most bites are benign, children and immunocompromised individuals may exhibit allergic responses.

#### 7. Management and Control

Control of household ant infestations requires a combination of “sanitation, exclusion, and targeted chemical treatments”

##### Recommended measures include:

- Sealing cracks and crevices.
- Proper food storage in airtight containers.
- Managing pet food and refuse bins.

Professional interventions—such as those provided by Bro4u's pest services—are effective in high-density infestations, especially with accurate species identification and customized treatment regimens.

#### 8. Heavy Metal Pollution and Community Shifts

A study near the Middle Ural Copper Smelter in Russia revealed that ant species richness and diversity peaked at intermediate pollution levels, but declined sharply in heavily polluted zones. Dominant forest species like *Formica aquilonia* were replaced by generalist species such as *Lasius niger* and *Myrmica ruginodis* closer to pollution sources. This shift reflects a loss of habitat specialists and ecological function under high contamination stress [16].

#### 9. Physiological and Behavioural Effects

Pollution, especially heavy metals, has been shown to:

- Reduce immune defense and body size of worker ants.
- Lower colony density and reproductive success.
- Alter foraging behaviour and interspecies interactions.

#### 10. Indian Context and Habitat Disturbance

In India, while direct pollution-focused studies are limited, habitat disturbance (often linked to pollution) has been shown to reduce ant diversity. A review emphasized that ants are highly responsive to microclimatic changes and resource shifts caused by anthropogenic stressors, making them reliable bioindicators of ecosystem health.

#### 11. Karnataka-Specific Observations

In Tumakuru, Karnataka, a study found that agricultural intensification and habitat modification led to a decline in ant species richness, though resilient genera like *Camponotus* remained dominant. Despite regular habitat changes, some regions still supported diverse ant communities, suggesting pockets of ecological resilience amidst anthropogenic pressures.

#### Conclusion

Ants in India represent a highly adaptable group with both beneficial ecological functions and potential drawbacks when cohabiting with humans. An enhanced understanding of “species-specific behaviours, nesting ecology, and dietary needs” is crucial to developing effective control strategies and preventing public health challenges.

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