

# Influence of colony associated factors on nest selection in an Indian queenless ant

RAJBIR KAUR and SUMANA ANNAGIRI Behaviour & Ecology Lab, Department of Biological Sciences, Indian Institute of Science Education and Research (IISER) Kolkata, Mohanpur, India

**Abstract.** 1. Organisms face the difficult task of selecting an optimal new nest from the available options during relocation. Studies on honeybees and ants in their natural habitat indicate that scouts encounter multiple options that vary in their physical and biotic characteristics.

2. Architectural features, location, odour, and the presence of nest mates impact their choice of nest site selection. In order to examine the influence of diverse parameters on final nest site selection we conducted choice experiments on ants in the context of relocation.

3. After controlling for any influence by physical characteristics, we found that the presence of brood, adults, and colony odour acted as attractants with more colonies relocating into these new nests than expected by chance alone. In contrast, the presence of a reproductive female, or familiarity of location had no influence on the choice. New nests containing dead ants evoked cleaning responses from scouts, which may interfere with relocation into these nests.

4. Even although colonies consist of hundreds of adults and brood, colony integrity was maintained in 98.7% of colonies. Furthermore, we found that none of the eight studied colonies relocated when faced with minor flooding in their natural habitat, indicating that the cost of relocation is non-trivial and that this species is capable of minor damage repairs.

5. These observations highlight the complexity of relocation in general, allow the characterisation of desirable nest attributes in this species, and highlight the need for similar exploration in other social insects.

**Key words.** *Diacamma indicum*, gamergate, relocation, tandem running.

## Introduction

Many animals, including social insects, dwell in nests. Nests are a physical space where inhabitants live, reproduce, rear offspring, and gain protection from harsh environments and predators (Hansell, 1993). Many ground-dwelling ants are known to use pre-existing holes for nesting and they have the capability to remodel their dwelling to suit their changing requirements (Hölldobler & Wilson, 1990; Andrade *et al.*, 2007; Kaur *et al.*, 2012; Miranda *et al.*, 2012). Forces such as physical disturbance, changes in microclimatic conditions, increased predation, competition, and colony reproduction are known to cause

relocation in insect societies (Hölldobler & Wilson, 1990; McGlynn, 2012). During relocation, scouts find multiple options in the field (Visscher, 2007; Seeley, 2010; Gilbert *et al.*, 2011; Evison *et al.*, 2012; Kaur *et al.*, 2012; McGlynn, 2012) and choosing the optimal new nest among these options then becomes an important task. Variation among these options in their physical and biotic features makes the process of arriving at a decision complicated. A range of physical features, such as nest entrance, height, light penetration, cavity size, and other colony associated features like the presence of reproductives, workers or brood, species odour, or even being an old location (Dahbi *et al.*, 2008) may influence the choice of their new dwelling.

To date, few experiments have been conducted to examine the role played by these factors. These previous studies that have been conducted have explored the role of physical attributes associated with available options. In a serially monodomous ant species *Aphaenogaster araneoides* Emery, nest odour is known

Correspondence: Sumana Annagiri, Behaviour & Ecology Lab, Department of Biological Sciences, Indian Institute of Science Education and Research (IISER) Kolkata, Mohanpur 741246, West Bengal, India. E-mail: sumana@iiserkol.ac.in