Leaders follow leaders to reunite the colony: relocation dynamics of an Indian queenless ant in its natural habitat

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Whether they are simple or complex in their design, nests are important to the organisms that occupy them. For many organisms that use nests to rear their immature young, nests provide protection from predators and shelter from adverse changes in the environment. Although organisms expend significant resources in nest construction, sometimes nests need to be evacuated. Environmental disturbance, increased predation and dwindling resources are some of the factors that cause animals to change their nesting site. Social insects such as ants, bees and wasps are examples of species in which nests play a central role, both for rearing their immature young and for storing resources. For these species, nest relocation would be a complex undertaking, as a large number of nestmates and stored resources would need to be transported from one site to another. Ants also need to transport their immature young (egg, larva and pupa) which are particularly vulnerable and represent a significant ratio of the colony’s resource investment (Hölldobler & Wilson 1990; Visscher 2007). Despite the costs involved, relocation is necessary for colony reproduction to occur in some species of social insects. Honeybees, swarm-founding wasps and some species of ants reproduce by colony fission. In this process, the reproductive class and a subset of workers split from the parental colony and disperse to initiate the formation of another colony (Wilson 1971; Banschbach & Herbers 1999; Peeters & Ito 2001; Cheron et al. 2011).

The process of nest relocation has been studied in few species of social insects. Previous research has addressed different aspects of relocation, including the assessment of the quality of new nesting sites, convergence-related decision making for available sites and the flight mechanics of relocating honeybees (Camazine & Visscher 1999; Seeley & Buhrman 1999; Seeley & Buhrman 2001; Seeley 2003; Schaef et al. 2011). In contrast to honeybees, ants need to transport their brood during the relocation process, making the relocation of ant colonies a more complex process. Ants also lack the dance language that enables honeybees to share information with their nestmates regarding various nesting sites in their environment (Seeley 2010).

Instead of mass movement to a new site, as occurs in honeybees (Visscher 2007), most ants use chemical trails to demarcate the path to a new nest (Hölldobler & Wilson 1990) while others use either carrying and/or tandem running (Hölldobler & Wilson 1990). During tandem running, an ant leads a nestmate to a new location while...