

Short communication

Nest relocation and prey specialization in the ant *Leptogenys propefalcigera* Roger (Formicidae: Ponerinae) in an urban area in southeastern Brazil

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Summary

Leptogenys propefalcigera Roger in southeastern Brazil feeds exclusively on oniscid isopods, showing a strong preference for one of two species. The ant shows a conspicuous nomadic behavior, with frequent nest relocations. The significance of these features is compared with other species of *Leptogenys* and specialized predatory ants.

Some ant species prey on a taxonomically wide variety of prey items, while others feed on a relatively restricted taxonomic prey group (Wheeler, 1910). In a few genera of the subfamily Ponerinae, the ants store their prey in “kitchen middens”. Evidence of oligophagy is detected if only one or a few kinds of prey organisms are present in these middens (Wheeler, 1904, 1933; Wheeler and Mann, 1914; Wiley and Brown, 1983). Nest relocation is a very common behavior among ants, especially in species nesting in preformed cavities (see Steghaus-Kovac and Maschwitz, 1993, and references therein). The cost of migration is apparently low in these ant species since there is no nest-building activity. The genus *Leptogenys* is widespread throughout the tropical region (Kempf, 1972) and comprises several species with restricted feeding habits, such as termites, ant queens, sowbugs, and earwigs (Steghaus-Kovac and Maschwitz, 1993 and references therein). *Leptogenys propefalcigera* was observed feeding on virtually only one species of sowbug and presenting a frequent migratory behaviour. The present paper describes the habit of this ant in an urban area.

Observations were made from December 1, 1992 to March 10, 1993 in the urban area of São Vicente (46° 22' W 23° 58' S), State of São Paulo, SE Brazil. Two colonies were observed during the study period, but only one was checked daily. Special attention was given to the migratory and predatory behavior. Within a day, the

colony was observed 5 to 10 times, with one observation session lasting at least 30 min. All activities of the ants were recorded. No artificial light was used in nocturnal sessions since it could affect the behavior of the ants. Experiments involving food provisioning were carried out with one colony. The following food types were offered: honey:water 1:3, and some arthropods found in the hunting area.

Nests of *L. propefalcigera* were located in cracks and fissures of walls, always in preformed cavities. The only observed task related to nest maintenance was the removal of sand and trash from the nest. Nests were easily located by the refuse pile at the entrance. All signs of occupation disappeared one day after the ants had left the nest (the deposits were removed by the wind or carried away by minor workers of *Pheidole* sp.). Colonies of *L. propefalcigera* are active both day and night, and the commonest behavior observed outside the nest is foraging. Workers forage solitarily, but they may leave the nest alone or with one or two nestmates. Hunting behavior consists of active search for prey underneath leaf litter. Ants were never observed chasing prey; they gave up if the prey ran away. Workers were observed searching for prey from 10 min to up to 1 h. Almost all prey captures ($n = 54$) by the workers belonged to a single species of sowbug; only on two occasions were the workers observed carrying another species of sowbug. Workers were never observed drinking the sweet solutions, and in one experiment the ants showed a marked preference for the sowbug sp. 1. All six individuals of the sowbug sp. 1 offered were carried into the nest. Of the five sowbugs of sp. 2 offered, 3 were rejected on the spot and two were carried to the nest and left at its entrance after a few minutes (this species was much slower than sowbug sp. 1). A dead millipede and a diptera were also rejected on the spot.

The colony presented a conspicuous migratory behavior, with 17 migratory events observed in a 50-day period. On seven occasions, the colony returned to old nest sites. The minimum residence time was one day, the maximum ten days ($\bar{x} = 3.27$ days, S.D. = 2.63). The minimal migratory distance observed (between two nests) was 40 cm and the maximum 660 cm in a straight line ($\bar{x} = 259.3$ cm, S.D. = 193.97). The migratory process was observed twice during the study. The first migration was on January 22, 1993 (0110 h). About 60 ants were observed walking between the two nests, carrying larvae and pupae in their mandibles. On March 7, 1993 (2300 h), a group of 50 individuals was observed motionless on the wall (about 50 cm above the ground) and 5 workers were wandering in the vicinity (scout ants). The group consisted of 3 males, 13 workers holding larvae, 8 workers holding pupae, 2 workers with young males, one worker with a piece of prey (sowbug sp. 1), and 28 individuals apparently carrying nothing. Suddenly, a scout ant returned to the group and all individuals began to move in a straight line following one of the scout ants, a typical pattern recorded for other species of *Leptogenys* (Maschwitz and Schönegge, 1983; Maschwitz and Steghaus-Kovac, 1991; Steghaus-Kovac and Maschwitz, 1993). They walked 530 cm and occupied a fissure in the wall. Migratory events in *L. propefalcigera* have been observed more than 20 times in the same area since 1980 (always in groups of 30–60 individuals).

Nuptial flights were also observed twice during the study period. On January 11, 1993 (0135 h, $T = 25^\circ\text{C}$), several workers were observed excited at the nest entrance and 5 males of the same colony were moving hastily around the nest, making several short flights. The males were observed chasing workers and copulating outside

the nests (rapid abdominal movements touching the workers' extremities). The same behavior was observed on January 14, 1993, at 0030 h. Winged females were never observed in either nuptial flights or migratory events.

Although workers of *L. propofalcigera* were never seen carrying arthropods other than sowbugs, one might speculate whether such specialization would persist under low densities of the sowbug sp. 1, since in some *Leptogenys* prey preference appears to change according to local abundance of arthropods (Wheeler, 1904; Duncan and Crewe, 1994). Since oligophagy results in a specialized hunting strategy, nomadism may be advantageous in case of local extinction or rarity of the preferred prey, as proposed for army ants (Hölldobler and Wilson, 1990). In fact, nest relocation is common among specialized ant predators (Wilson, 1958; Longhurst and Howse, 1979; Mill, 1982; Maschwitz and Schönege, 1983; Steghaus-Kovac and Maschwitz, 1993; Leal and Oliveira, 1995).

Since several of these ant species use preformed cavities, the cost of migration must be low and the residence time should be lower than in species that construct nests (see also Maschwitz et al., 1989). In fact, the average residence time of some *Leptogenys* species (this study and Steghaus-Kovac and Maschwitz, 1993) is consistently lower than the average residence time obtained for, for example, *Pachycondyla* (= *Termitopone*) *marginata* (Leal and Oliveira, 1995). Migration might be also related to the behavior of storing prey in nest chambers. In wet tropical environments, dead prey decays in a few days, resulting in bacterial and fungi proliferation within the colony, which may harm ant eggs, larvae, and pupae (Brian et al., 1966).

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