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From ant behaviour to pheromone decay: does high temperatures effect differ according to recruitment strategy?

Louise van Oudenhove^{1,2}, Raphaël Boulay^{2,3}, Alain Lenoir⁴, Carlos Bernstein¹, Xim Cerdá²

¹ Université de Lyon, F-69000, Lyon ; Université Lyon 1 ; CNRS, UMR5558, Laboratoire de Biométrie et Biologie Évolutive, F-69622, Villeurbanne, France.

² Estación Biológica de Doñana, CSIC, C/Americo Vespucio s/n, Isla de La Cartuja, 41092 Sevilla, Spain.

³ Depto. Biología Animal. Facultad de Ciencias, Universidad de Granada, 14071 Granada, Spain.

⁴ CNRS UMR6035, Institut de Recherche de Biologie de l’Insecte, Faculté des Sciences de Techniques, Université François Rabelais, Parc de Grandmont, 37200 Tours, France.

Many ant species use pheromone to communicate resource location to nestmates. Mass-recruiting species lay long-lasting anonymous chemical trails while group-recruiting species use temporary chemical trails. We studied how high temperature influenced the foraging behaviour of a mass-recruiting species (*Tapinoma nigerrimum*) and a group-recruiting species (*Aphaenogaster senilis*). We first showed that the foraging activity dependence on temperatures was stronger for mass-recruiters than for group-recruiters in the field. Then, under controlled conditions, we isolated the effect of raising temperature (from 25°C to 55°C) on the trail pheromone of both species. Heating trail pheromone without raising soil temperature affected the behavioural response of the mass-recruiters more than the choice of the group-recruiters. With chemical analyses of the pheromone under the same temperature treatments, we determined the stability of the different chemical compounds present in the abdominal gland secretion of both species. Our results suggest that mass-recruiting species invest more in communication efficiency than group-recruiting species. Since the latter was less affected by pheromone evaporation at the behavioural level, group-recruitment might be an adaptation to variable environment with fluctuating temperatures.