



Environmental and social cues: individual decisions during the construction of ventilation turrets in leaf-cutting ants

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The leaf-cutting ant *Atta vollenweideri* is unique in constructing turrets with excavated soil pellets on top of nest openings. As turrets passively enhance nest ventilation via wind-induced flows, individual decisions where to construct such ventilation turrets are expected to depend on the prevailing environmental cues at the nest openings, for instance airflows, humidity and CO₂ levels. Besides their response to environmental cues, workers may also rely on the decisions made by workers already involved in the building process, and therefore use social cues while building turrets. We investigated the extent to which assessment of both environmental and social cues underlies decision making by individual workers during turret construction. We developed a laboratory procedure to investigate individual turret-building behavior, by presenting single workers carrying building material with a choice between two potential construction sites that differ in the cues, both environmental and social, triggering turret building. In a choice situation, single workers preferred to deposit clay pellets for turret construction at openings with higher air humidity, with increased CO₂ levels, and at those delivering air outflow rather than inflow. In addition to the observed preferences for environmental cues, single workers preferred to deposit their loads at locations where pellets were already present. The presence of such a social cue strongly influenced workers' choices, since an opening with pre-deposited pellets was preferred even if combined with the otherwise-rejected dry air. Workers transported significantly smaller loads at the initial phase of turret construction, suggesting that the process of pellet transport is tuned for information transfer at the very beginning. Taken together, results indicate that workers show clear preferences for environmental cues, yet they strongly favor former decisions of nestmates for pellet deposition during turret construction.