



Social learning and cumulative cultural evolution in the house-hunting ant, *Temnothorax albipennis*

Author(s): Takao Sasaki, Takao Sasaki , Leo Danczak , Beth Thompson , John Yohan Cho , Stephen C. Pratt

Institution(s): University of Oxford ; University of Oxford ; University of Oxford ; Arizona State University ; Arizona State University ; University of Oxford

Recent studies have suggested that non-human animals can improve collective performance by accumulating knowledge over generations, known as cumulative cultural evolution (CCE). The rock ant, *Temnothorax albipennis*, is known for “teaching” foraging routes to other nest mates through tandem-running, in which an experienced ant leads a naïve one to the food source. Thus, these ants may achieve CCE by transferring information through tandem-running to progressively increase the efficiency of foraging routes. To test this hypothesis, we adapt a canonical method for testing CCE in humans: generational succession is simulated through a chain of tandem-running pairs of a leader and a follower during foraging. That is, a follower in one ‘generation’ later becomes a leader in the following ‘generation’. We first test whether followers acquire route information from their leaders by measuring similarities between the tandem-running routes initiated by leaders and the subsequent routes by followers. We then investigate if the ants can accumulate culture by testing the main criteria for CCE: performance improves over ‘generations’ and eventually outperforms individuals who have the same number of trips. We will talk about potential mechanisms of CCE that do not rely on complex cognitive abilities.