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Evolution of Optimum Foraging Distributions in Two Dimensions
NATHAN DEES, SONYA BAHAR, FRANK MOSS, University of Missouri - St. Louis — In the pursuit of optimally efficient foraging, preferred distributions of movement characteristics have been shown to exist for many types of animals and environments. Specifically, planktonic organisms such as *Daphnia* use exponential distributions of turning angles, α, in a *"hop, pause, turn by angle α, hop..."* random walk-type sequence of movement when traversing experimentally prepared feeding solutions consisting of freeze dried *Spirolina* and water. We investigate the evolution of such random walks in a two-dimensional foraging model. In this model, agents traverse a feeding patch of finite size and for a finite amount of time using hop lengths and turning angles chosen randomly from inherited distributions. Distributions evolve as the choices made by the most efficient forager of one generation influence the distributions available to the succeeding generation. Preliminary results show that initially uniform turning angle distributions evolve to explicit exponential distributions after thousands of generations, consistent with the experimental observations described above.

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