Abstract Submitted
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**Ant colonies and foraging line dynamics: Modeling, experiments and computations** LOUIS ROSSI, University of Delaware — Ants are one of several types of insects that form robust and complex societies, and as such, provide rich theoretical ground for the exploration and understanding of collective dynamics and the behaviorial parameters that drive the dynamics. Many species of ants are nearly or completely blind, so they interact locally through behaviorial cues with nearby ants, and through pheromone trails left by other ants. Consistent with biological observation, two populations of ants are modeled, those seeking food and those returning to the nest with food. A simple constitutive model relating ant densities to pheromone concentrations yields a system of equations describing two interacting fluids and predicts left- and right-moving traveling waves. All the model parameters can be reduced to two Froude numbers describing the ratio between a chemical potential and the kinetic energy of the traveling ants. Laboratory experiments on *Tetramorium caespitum (L)* clearly indicate left and right-moving traveling density waves in agreement with the mathematical model. We focus on understanding the evolutionary utility of the traveling waves, and the optimality of the Froude numbers and other parameters.

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