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Agent-based and Continuous Models of Locust Hopper Bands.

Locusts gather by the millions to feed on crops, destroying fields of agricultural produce. As juveniles, wingless locusts march together and form a variety of patterns including wave fronts. We examine this collective propagation through two models: an agent-based model and a set of partial differential equations. The agent-based model is directly linked to individual behavior with respect to resource availability and differs from previous such models in that direct locust-to-locust interactions are not involved. The PDE model yields insight into the collective, analytic behavior of the aggregate group. In this talk, I will introduce both models and some of the conclusions we have been able to draw in the context of data from the biological literature and parameter sensitivity analysis. (Received September 09, 2019)