A Study of Ant Foraging Behaviour

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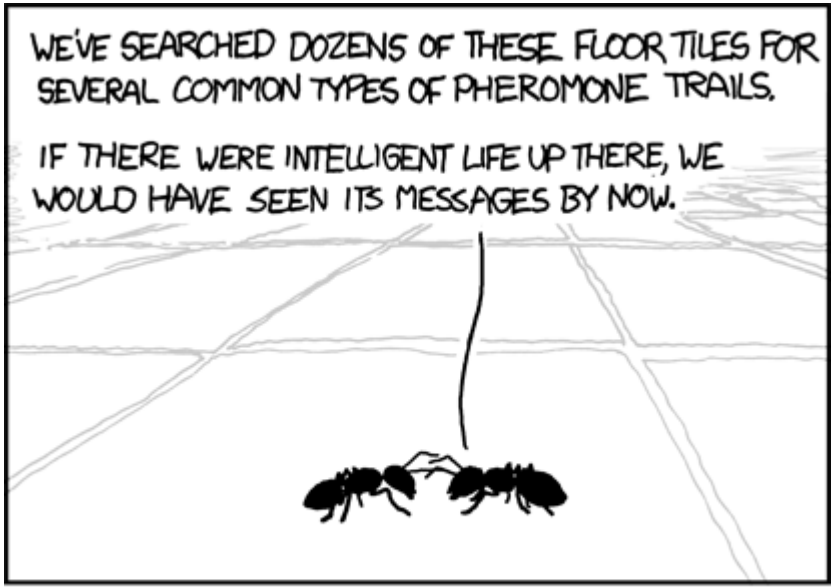
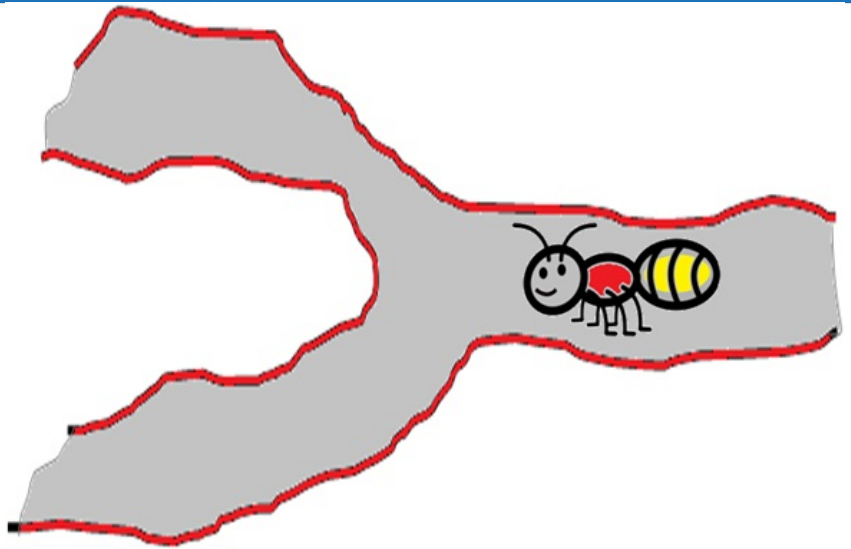
Ants are “Superorganisms”

- Foraging
- Nest building
- Reorganization of tasks
- Waste management

Foraging Behaviour



Quantitative Models



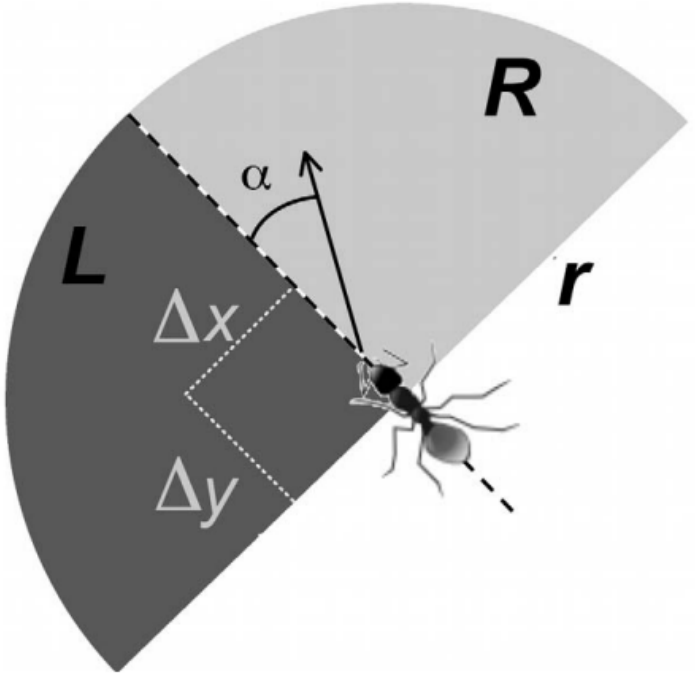
$$p_1 = \frac{(x_1 + \alpha)^\beta}{(x_1 + \alpha)^\beta + (x_2 + \alpha)^\beta}, \qquad p_2 = 1 - p_1$$

New Model

Proposed in 2012

“Individual Rules for Trail Pattern Formation in Argentine Ants” by Theraulaz *et. al.*

New Model



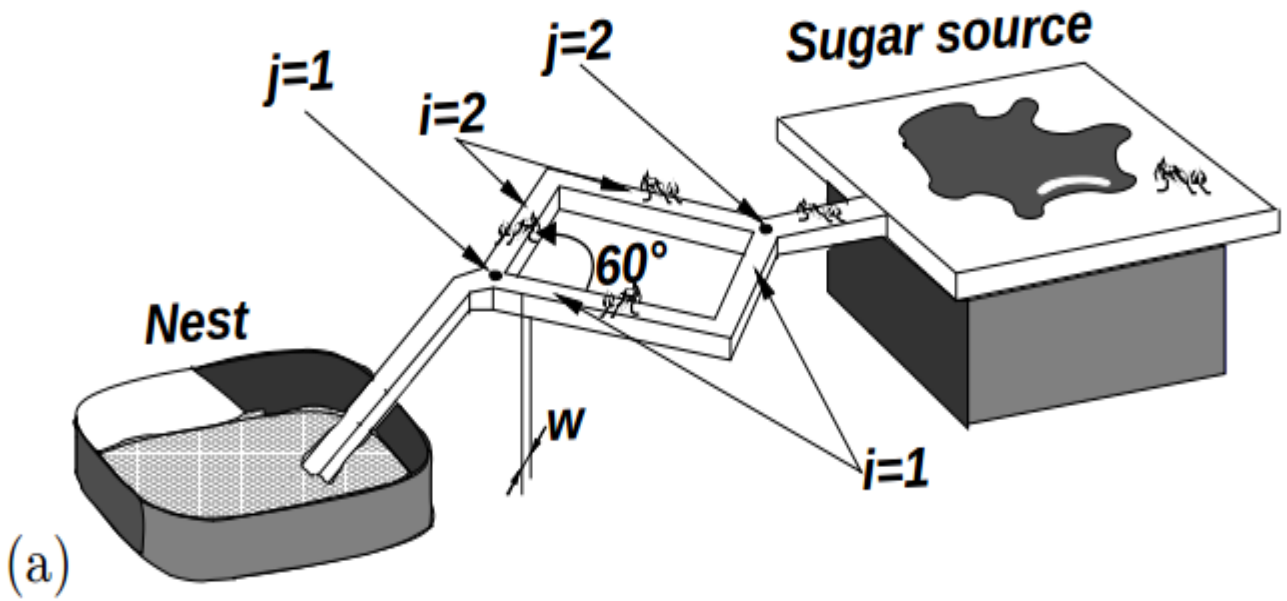
$$\alpha = A\frac{(L-R)}{(L+R)}$$

Computational simulation

- Based on the new model

Given the set of parameters, and initial conditions display the trail (and location of ants) at a later time

Experiment Analysis



Progress so far

References

- Self-organized structures in a superorganism: do ants behave like molecules? -by Claire Detrain and Jean-Louis Deneubourg
- Individual Rules For Trail Pattern Formation in Argentine Ants -
- Analytical and Numerical Investigation of Ant Behaviour Under Crowded conditions