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Social Insect Simulation. Preliminary report.

The social dynamics of ants is particularly interesting during nest foundation. The harvester ant *Pogonomyrmex Californicus* displays two main strategies for nest founding. The preference for one strategy over the other is genetically linked, so one would think that a particular strategy would eventually prevail evolutionarily. However, these two strategies have been observed in coexistence for successive years in the same area. In order to understand how this could occur, I created a simulation of the lifecycle of queen ants with an agent-based modeling software. I attempted to capture the social dynamics of both strategies, as well as environmental factors. The results of the model show a close tie between environmental factors and behavioral differences. After numerous trials I began to identify which conditions generally favor which strategy. To strengthen the results I worked with several students and professors who had collected almost 1000 queens of this species, creating habitats for and recording the behavior of both types of queens. These results can be used to strengthen the model. This project allows a deeper understanding of the coexistence of the two strategies, and of cooperation more generally. (Received September 16, 2014)