

Ants found to encode nest structural plans in building materials

19 January 2016, by Bob Yirka



(Phys.org)—A team of researchers from several institutions in France has found that some common black garden ants leave building instructions in pillars for other worker ants to follow. In their paper published in *Proceedings of the National Academy of Sciences*, the team describes their study of ants in their lab, what they have found so far, and their goal of learning once and for all how it is that creatures with such tiny brains can build such complicated nests.

To learn more, the researchers started a nest by putting approximately 500 [ants](#) into a simple Petri dish with some sand and then watched very carefully as the ants began to organize and build a nest. They noted that within just a few hours, the ants had begun to build what the team describes as pillars, by shaping sand into pellets and then stacking the pellets—all of which were evenly spaced at approximately ten millimeters from each other. The ants continued piling onto the pillars until the pillars reached a height that was approximately the length of a single ant. At that point, the ants changed over to placing sand on

the sides of the pillars, creating structures that eventually led to the building of a roof.

But, the researchers want to know, how did the ants know to keep piling onto the pillars, rather than tossing [sand](#) bits any which way? Closer study revealed that the ants were more likely to place pellets at sites that had already had other pellets placed on them, which led to pillar building. And the reason they did so appeared to be tied to pheromones that some of the ants had placed in pillar bases during early construction. That pheromone appeared to attract the other ants, causing them to drop their pellet at a spot that had attracted them. The team confirmed this by building some of the pillars themselves that appeared to be identical to the ones the ants had built—but the ants were not attracted to them, the [pillars](#) sat ignored.

The researchers have not yet discovered the pheromone the ants are using but plan to continue the research in an effort to find it, proving once and for all that at least one of the secrets of complex nest [building](#) by ants, is the use of pheromone cement. They have built simulations based on their ideas and thus far, the simulations show that it should be possible to build structures similar to ant nests, with nothing more than pheromone attraction.

More information: "Stigmergic construction and topochemical information shape ant nest architecture," *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1509829113

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APA citation: Ants found to encode nest structural plans in building materials (2016, January 19)
retrieved 24 June 2021 from <https://phys.org/news/2016-01-ants-encode-materials.html>

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