

Intestinal flora of cockroaches and termites reflects these insects' family relationships, and divergent diets

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Researchers at the Max Planck Institute for Terrestrial Microbiology, Marburg, Germany, have compared the microbial ecosystems in the intestines termites and cockroaches, with fascinating results. The research is published in the April *Applied and Environmental Microbiology*.

It may be hard for people outside of certain scientific domains to muster anything but [disgust](#) for [termites](#) and cockroaches. Cockroaches, after all, infest our homes, and termites eat them. But despite their different life strategies—termites feed exclusively on wood, while cockroaches are the epitome of omnivory—these two culturally stigmatized insects are closest relatives. The microbial denizens of the termite [gut](#) have been the objects of intense study by microbiologists, with the goal of greatly boosting the conversion efficiency of cellulosic materials to biofuels, but cockroaches' intestinal inhabitants have gone ignored, despite suspicions that pathogens are among them.

“We wanted to determine to what extent, despite striking differences in diet, the gut community of cockroaches resembles that of their closest relatives, the termites,” says coauthor Claire L. Thompson. “We found that termites and cockroaches contain many gut bacteria of the same families, which indicates that the evolutionary history of the host is an important factor determining the structure of the gut microbial community. However, we found also that the abundance of these

different lineages differs fundamentally between termites and cockroaches, which we ascribe to their different diets.” In fact, she says, the relative abundance of different bacterial groups in the cockroach gut more closely resembles that of other omnivores, such as humans and mice.

“Our research suggests that the gut microbiota of termites and cockroaches reflects both their common evolutionary origin and their different feeding habits,” says Thompson. “Many bacterial lineages seem to have been associated with the cockroaches already when the termites split off more than 130 million years ago.” Additionally, the researchers showed that the bacterial community of the cockroach intestine is “much more complex than it appeared from previous cultivation-based studies,” and disease causing microorganisms therein “are actually quite rare.”

In the paper, the researchers note that termites fall within the radiation of cockroaches, and that they “should be considered merely a family of social [cockroaches](#).” But current taxonomy has yet to catch up with these relatively recent findings.

More information: C. Schauer, et al, 2012. The bacterial community in the gut of the cockroach *Shelfordella lateralis* reflects the close evolutionary relatedness of cockroaches and termites. *Appl. Environ. Microbiol.* 78:2758-2767. [doi:10.1128/AEM.07788-11](https://doi.org/10.1128/AEM.07788-11)

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