Title:	Community diversity and functions of arthropod associated symbionts
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Abstract:	Arthropods represent one of the most successful groups of eukaryotes and inhabit diverse habitats and feed on various substrates. A key reason behind this success is their symbiotic associations with various microbes. Such symbionts are widely distributed and affect their survival, nutrition, reproduction and development. In my thesis, I have focused on two such arthropod-associated symbionts i.e., maternally inherited endosymbionts and gut symbionts. I investigated the transmission of three maternally inherited endosymbionts (Wolbachia, Cardinium and Arsenophonus) within a soil arthropod community and analyzed whether such ecological communities can act as the seat for endosymbiont transfer and diversification. I hypothesized that if endosymbionts are first moving within a community via horizontal transfer, then closely related bacterial strains should be observed within that community. Results indicate that Wolbachia supergroup A and Cardinium indeed show such patterns of sequence similarity as compared to Wolbachia supergroup B and Arsenophonus. To study gut symbionts, I used the lower termite Coptotermes heimi as a model system as they harbor symbionts from all the three domains of life (Bacteria, Archaea and Eukarya). Enzymes secreted by these symbionts are crucial for wood digestion by the termites. I looked into the diversity, function as well as transmission of gut microbial communities in termites using metagenomic and amplicon sequencing approaches. Results suggest that members of the bacterial community such as Spirochaetes, Bacteroidetes, Proteobacteria and Firmicutes are involved in the production of glycosyl hydrolases (GHs) which are important enzymes for wood digestion. Gut symbionts that are part of the core microbiota or have an obligatory association with the termite host are mainly transferred from generation to generation. By combining various methods and tools from ecology, evolution, biodiversity, phylogenetics, and genomics I show the importance of these symbionts in arthropods.
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