
The microbiota as a bacterial passport? Community structure and major players in the terrestrial isopod microbiome

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Abstract

While a large body of work on arthropod microbiotas has been conducted on insects, terrestrial isopod crustaceans also represent excellent model systems for complex multipartite symbioses. Considering their ecological role as key decomposers in many terrestrial ecosystems, it has long been hypothesised that bacterial symbionts might contribute to the digestion of plant organic matter. Moreover, the terrestrial isopod *Armadillidium vulgare* represents a major model system for arthropod-*Wolbachia* symbioses due to its well-characterised association with feminizing *Wolbachia*. Here we present the first in-depth investigation of the host-associated microbiota of *A. vulgare*. To this end, 16S rRNA pyrotags and whole metagenome sequencing were used to characterize the bacterial communities in (i) individuals from both laboratory lineages and field populations and (ii) in various host tissues. This integrative approach allowed us to reveal an unexpectedly high bacterial diversity, notably compared to many insect models. While *Wolbachia* represented the predominant taxon in infected individuals, it was not the only major player. Together, the most abundant taxa represented a large scope of symbiotic interactions, including bacterial pathogens, a reproductive parasite (*Wolbachia*) and potential nutritional symbionts. *Candidatus* Hepatoplasma crinochetorum, a facultative symbiont previously reported from the midgut caeca, was for the first time observed in all tested host tissues. Most importantly, we demonstrate that individuals from different populations harboured distinct bacterial communities, indicating a strong link between the host-associated microbiota and environmental bacteria, possibly due to terrestrial isopod nutritional ecology. Overall, this work opens new perspectives for the study of host-symbiont-microbiota interactions in a non-model organism.

Keywords: microbiota, terrestrial isopod, crustacea, wolbachia

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