



Bacterial endosymbionts in *Asellus aquaticus* (Isopoda) and *Gammarus pulex* (Amphipoda), and their contribution to digestion

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ABSTRACT: We demonstrate for the first time the presence of bacterial endosymbionts in the midgut glands (hepatopancreas) of the freshwater detritivore *Asellus aquaticus* (Isopoda), whereas the hepatopancreas of another crustacean detritivore, *Gammarus pulex* (Amphipoda), which coexists with the former species, was devoid of such bacteria. We detected both phenol oxidase and cellulase activity in hepatopancreatic extracts from both detritivores, which suggests that both of these enzymes are produced in the midgut glands of both species. After treatment with antibiotics, both the number of hepatopancreatic bacteria and enzymatic activity were reduced in the isopod hepatopancreas, but antibiotics had no effect on enzyme activity in the amphipod hepatopancreas. Feeding on microbially inactivated leaf litter did not affect enzyme activity in hepatopancreatic extracts from *A. asellus*, but increased cellulase activity was seen in the hepatopancreas of *G. pulex*. These results (1) confirm the hypothesized enzymatic adaptation of crustacean freshwater detritivores to their food sources of terrestrial origin, (2) demonstrate that the isopod *A. aquaticus*, like its terrestrial relatives, contains endosymbiotic bacteria that contribute to digestive processes, and (3) show interspecific differences between these coexisting crustacean detritivores in terms of enzyme origin and their dependence on microbiota.

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