# In Vivo Isotopic Labeling of Symbiotic Bacteria Involved in Cellulose Degradation and Nitrogen Recycling within the Gut of the Forest Cockchafer (*Melolontha hippocastani*).

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**Projects**

*Melolontha hippocastani* gut specialized bacterial community: function and structure elucidation
Details

**Abstract**

The guts of insects harbor symbiotic bacterial communities. However, due to their complexity, it is challenging to relate a specific symbiotic phylotype to its corresponding function. In the present study, we focused on the forest cockchafer (Melolontha hippocastani), a phytophagous insect with a dual life cycle, consisting of a root-feeding larval stage and a leaf-feeding adult stage. By combining in vivo stable isotope probing (SIP) with 13C cellulose and 15N urea as trophic links, with Illumina MiSeq (Illumina-SIP), we unraveled bacterial networks processing recalcitrant dietary components and recycling nitrogenous waste. The bacterial communities behind these processes change between larval and adult stages. In 13C cellulose-fed insects, the bacterial families Lachnospiraceae and Enterobacteriaceae were isotopically labeled in larvae and adults, respectively. In 15N urea-fed insects, the genera Burkholderia and Parabacteroides were isotopically labeled in larvae and adults, respectively. Additionally, the PICRUSt-predicted metagenome suggested a possible ability to degrade hemicellulose and to produce amino acids of, respectively, 13C cellulose- and 15N urea labeled bacteria. The incorporation of 15N from ingested urea back into the insect body was confirmed, in larvae and adults, by isotope ratio mass spectrometry (IRMS). Besides highlighting key bacterial symbionts of the gut of M. hippocastani, this study provides example on how Illumina-SIP with multiple trophic links can be used to target microorganisms embracing different roles within an environment.

**Identifier**

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