Animals get fat for winter: What about soil microbes?

A wide range of organisms stores food and energy for later by 'fattening up', or in more scientific terms, by increasing their intracellular storage in the chemical form of, amongst others, fat.

These stored resources provide important advantages during winter or drought, when food is scarce, allowing them to survive and thrive when food becomes available again. Storage is an important fitness advantage.

Some microbes can store energy and carbon, too, e.g., through intracellular granules of polyhydroxy alkanoates (PHAs) but surprisingly not much is known at all about the relevance of resource storage in soil.
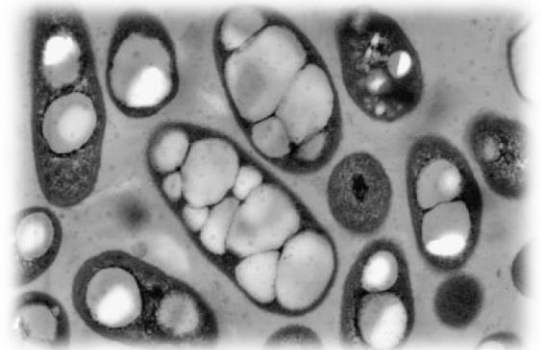
Koller et al. (2011) Eng Life Sci 11:222

Understanding how C and energy are cycled in soil is critically important as soils may act as CO_2 sinks (considering climate change). Carbon cycling provides the energy for nutrient cycling in soil, and therefore affects nutrient dynamics in soil (considering plant nutrition). We have developed a biomarker toolbox to determine "how fat the microbes are".

In the course of this project, we are looking for motivated BSc and MSc students to help us dig deeper into the drivers and dynamics of storage in soil.

Examples for MSc and BSc thesis include:

- How fat are the microbes: Microbial storage (PHB) across temperate grasslands in Germany (BSc thesis, a 'proof of concept' study)

- Microbial storage compounds as an intermediate sink for recent photosynthates (MSc thesis on a $^{13}CO_2$ plant labelling experiment; ^{13}C-PLFA/^{13}C-NLFA, ^{13}C-PHB, ^{13}C-MBC)

- Is the gross primary productivity a good predictor for microbial storage? (MSc project, involves very mild modelling and GIS work / remote sensing data)

Required skills: the candidates should have a strong background in biological or soil sciences and be willing to deal with chromatographic datasets.

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