Carbon, which is a key element for life on Earth, is the main element of all organic compounds. Fungi, like all other heterotrophic organisms, must obtain it from the environment. Plant-, animal- or even fungal-derived organic matter is usually used as the carbon source. However, the plant material that consists primarily of cellulose, and other complex organic compounds is used the most commonly. Most of these organic compounds cannot be directly absorbed by the fungal cell. Therefore these organisms are producing extracellular enzymes, allowing decomposition of polymers to smaller compounds that can be absorbed. The ability to use different carbon sources available in the substrate is therefore one of the main factors defining ability of a given organism to occupy the particular niche.

Mucorales were probably among the first fungi colonizing the terrestrial environment. Representatives of this group are commonly encountered in different habitats in all parts of the world. They can be often found on spoiled bread or strawberries. The vast majority of them are saprotrophic organisms, feeding on dead organic matter. However, some species of this group may also be dangerous pathogens of humans and animals.

The project aims to answer the question how the ability to use different carbon sources evolved among Mucorales.
We would like to know:
a) whether the evolutionarily oldest lineages of Mucorales have a primitive enzymatic machinery allowing for uptake of only relatively simple organic compounds?
b) whether the obtained carbon assimilation profile depends on the characteristic of a substrate colonized or on a position of the fungus on the "tree of life" (reflecting the relationship between the studied species)?

100 strains, representing more than 70 species of Mucorales will be used during this study. The experiment will be carried out on FF microplates, allowing simultaneous testing of the ability to use 95 different carbon sources. Furthermore, the ability of these strains to growth on plates with natural substrates (such as dung agar or wooden pulp) will also be tested. Finally, the results will be mapped on the tree reflecting the relationships between the studied fungi. This will allow us to know whether closely related fungi share similar carbon assimilation profiles.