08 Accelerator Grants

Scaling the impact of viruses from single cells to the global methane cycle

Accelerator Grant

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Wetlands cover roughly 5% of the global land surface and provide important ecosystem services such as wildlife habitat. These ecosystems host diverse microbial and viral communities which have been shown to mediate important cycles. In addition, wetlands store 29–45% of the terrestrial soil organic carbon and are regarded as natural carbon sinks which play profound roles in biogeochemical cycling and carbon sequestration via microbial activity. However, these ecosystems are considered major sources of methane (CH_4), which contribute 30–40% of global emission. Despite their importance, surprisingly little is known regarding wetlands in African ecosystems. Previous studies suggest that the proportional increase in CH_4 emission from the wetlands may be associated with warming conditions. Similarly, increasing temperature may accelerate microbial-viral interaction in the soil. Such a result may not only accelerate the decomposition of soil organic carbon but may speed up microbial lysis (methanogens and methanotrophs) due to viral infection. A direct result is the modulation of methane emission in the wetland ecosystem. Despite this, there is an existing paucity of knowledge on the CH_4 fluxes from the wetland soils due to microbial lysis by the viruses.

The purpose of this HFSP Accelerator project is to elucidate the microbe-viral interaction and methane fluxes from the wetland soils. The study is going to employ high throughput sequencing (16S rRNA and shotgun metagenomics) sequencing as well as qPCR techniques to determine microbial and viral diversity as well as accessing methane emission from in wetlands. The project is envisaged to give an insight into the diversity of microbes and viruses and their distribution pattern based on seasonal temperature changes. It will further reveal the methane emission due to microbial-viral interaction.