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Conference Abstract

# Identifying genome level variation in generalist and specialist bacteria and their relationship to abiotic conditions in European freshwater ecosystems

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## Abstract

Microbial biodiversity is one of the increasingly studied fields, yet we are unable to accurately pinpoint the intricacies of how the biotic landscape changes with its abiotic counterpart. Every organism reacts differently to physical changes in its surrounding(Zeglin (2015)). While there are some generalist microbes that can grow in limited capacity in many different types of environment, there are also some specialists that can flourish in very specific environments(Monard et al. (2016)).

We hypothesize that both generalists and specialists have developed advanced strategies that allow them thrive under diverse conditions or in very specific niches, and that these changes should be traceable on the genomic level. We expect to see variations in factors like genome sizes, number of genes, GC content, metabolic pathways that yield growth and replication advantages in nutrient deficient niches and defense mechanisms. We also expect to identify genomic streamlining in organisms that survive in nutrient deficient environments.

We are currently studying the genetic basis of why these generalists are so universally present though in smaller numbers, and what allows the specialists to efficiently exploit the abiotic factors of their specific environment in order to flourish. To pursue this, we have sampled and sequenced metagenomes from 47 lakes spread across Europe with strongly diverging environmental conditions such as pH, temperature, organic and nutrient content, elevation, and conductivity.

We've identified reads from more than 9000 taxonomically unique organisms, of which 700 were identified as generalists and 1200 as specialists, based on niche width permutations. In total we have assembled 313 high quality Metagenome Assembled Genomes (MAGs). Which now allow us to get a more detailed insight into the genetic basis and specific adaptations of these organisms.

## Keywords

Metagenomics, MAGs, Biodiversity, Generalists, Specialists

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