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# 17TH INTERNATIONAL SYMPOSIUM ON MICROBIAL ECOLOGY - ISME 17

12 – 17 August 2018, Leipzig, Germany

*Round table on cave biofilms and Janez Mulec explaining the importance of safety during sampling in the underground (Photo: A. Summers Engel)*

ISME meetings have been organized regularly since 1977, and in 1986 the 4th ISME was hosted by Ljubljana. The 17th ISME was in Leipzig, Germany, where 2250 delegates from 60 countries met. During the symposium eight plenary lectures, 26 different sections and three days of poster presentations were organized. A participant could choose one of six or seven simultaneously running sections daily which covered an extremely wide set of microbial ecology from evolution, modeling of microbial interactions, review on new and existing metabolic pathways, (meta)genomics, interactions between microbes and hosts, biogeochemical cycles, bioinformatics, new methods and innovative bioremediation procedures. It became clearly evident that microbial ecology can offer some answers to many urgent global issues. Some interesting highlights from the symposium are given below.

Climatic changes are now more obvious and challenging for microbial ecologists than ever. For example: atmospheric carbon reached high levels not seen in the last 800.000 years, more places on Earth face temperature surpassing 50°C than before, the north pole more frequently has temperatures above freezing point in winter, and active immigration of cyanobacteria to the arctic regions is a fact. Recently discovered blackened cover at Greenland is due to algae. Microplastic count reached 10% of algal counts in the Arctic sea. Half of soil carbon is buried in permafrost which is thawed at about one cm per year.

Microbes do not cease to impress. For example, they can live just fine on poor concentrations from the atmospheric hydrogen, such as *Mycobacterium smegmatis* which synthesizes high-affinity hydrogenases. Filamentous cable bacteria are remarkable because they conduct electricity across distances over one cm in sediments and groundwater aquifers. Microbes with small genome consequently need "a partner" to improve the survival strategy. But sometimes even a "good looking" neighbour can be fatal for some microbes. Namely, one third of cells is daily killed by viruses. An interesting insight from aquatic ecology was reported: nitrogen loss can be linked to copepods' associated microbes due to their high rate of denitrification.

Now we know that chemosynthesis is more widespread in the environment than previously thought. Cold sediments contain typical thermophilic microbes which probably come from deep biosphere. It seems sometimes that dormancy can be a dead end strategy in old sediments for many microbes. During the growth phase, cells do require environment with higher nutrient availability.

It is clear now that more than 10 million human deaths annually are due to antimicrobial resistance. Wastewater treatment plants are recognized as hot spots for the evolution of antibiotic resistances. Gene transfer is globally understood as an important mechanism to spread antibiotic resistance in the environment. In this respect it is worth mentioning that conjugation (transfer of genetic material between bacterial cells) in the envi-

ronment depends on cell density, stirring rate and oxygen availability. Furthermore, a single integron (genes embedded in a specific genetic structure called gene cassette) of a clinical sample can contain up to 10 antibiotic resistance genes. Human health depends on microbiome. Faecal microbiota transplantation to improve health status is slowly becoming a reality; you just need a proper donor for successful colonization/operation.

And for taxonomists it seems that reclassification will be an important future job as only about 20% of microbial taxa is currently named validly. And even from this respect, cultivation is still needed.

For the first time, cave microbiology was largely exposed at the ISME meeting. There was a round table organized by Tillman Lüders and Deepak Kumaresan dedicated to cave biofilms as a model system for microbial ecology. Other panel members were Serban M. Sarbu, Annette Summers Engel, Janez Mulec and Alexandra Hillebrand-Voiculescu. The round table demonstrated that study of cave biofilms can inspire future research in biochemistry, ecology, biotechnology, ecotoxicology and astrobiology.

The new president of the society with a two-year mandate has become Ed DeLong from USA. The next ISME 18 symposium will be in Cape Town in South Africa from 9 to 14 August 2020.

*Janez Mulec*