



Microbial Mats

Structure, Development and Environmental Significance

Edited by
Lucas J. Stal Pierre Caumette

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Microbial Mats Structure Development And Environmental Significance Nato Asi Subseries G

Lei Shi



Microbial Mats Structure Development And Environmental Significance Nato Asi Subseries G:

Microbial Mats Lucas J. Stal, Pierre Caumette, 2013-06-29 Microbial mats are benthic communities of a variety of microorganisms. Their investigation requires multidisciplinary studies and close cooperation between microbiologists, biogeochemists, and geologists. Reported here are recent advances in the study of structure, development, and ecological relationships. The methodology described includes microensors as well as new molecular techniques for the detection and identification of microorganisms. Increasing interest exists for applied aspects, e.g., the possibility to use natural or constructed microbial mats for the degradation of xenobiotics for site remediation, etc. *Verzeichnis lieferbarer Bücher*, 1999

International Books in Print, 1986 **Microbial Mats** Caumette, P., Stal, L.J., 1994 **Systems biology and ecology of microbial mat communities** Martin G. Klotz, Donald A. Bryant, Jim K. Fredrickson, William P. Inskeep, Michael Köhl, 2016-04-11 Microbial mat communities consist of dense populations of microorganisms embedded in exopolymers and/or biomineralized solid phases and are often found in mm-cm thick assemblages which can be stratified due to environmental gradients such as light, oxygen, or sulfide. Microbial mat communities are commonly observed under extreme environmental conditions deriving energy primarily from light and/or reduced chemicals to drive autotrophic fixation of carbon dioxide. Microbial mat ecosystems are regarded as living analogues of primordial systems on Earth and they often form perennial structures with conspicuous stratifications of microbial populations that can be studied in situ under stable conditions for many years. Consequently, microbial mat communities are ideal natural laboratories and represent excellent model systems for studying microbial community structure and function, microbial dynamics and interactions, and discovery of new microorganisms with novel metabolic pathways potentially useful in future industrial and/or medical applications. Due to their relative simplicity and organization, microbial mat communities are often excellent testing grounds for new technologies in microbiology, including micro-sensor analysis, stable isotope methodology, and modern genomics. Integrative studies of microbial mat communities that combine modern biogeochemical and molecular biological methods with traditional microbiology, macro-ecological approaches, and community network modeling will provide new and detailed insights regarding the systems biology of microbial mats and the complex interplay among individual populations and their physicochemical environment. These processes ultimately control the biogeochemical cycling of energy and/or nutrients in microbial systems. Similarities in microbial community function across different types of communities from highly disparate environments may provide a deeper basis for understanding microbial community dynamics and the ecological role of specific microbial populations. Approaches and concepts developed in highly constrained, relatively stable natural communities may also provide insights useful for studying and understanding more complex microbial communities.

Microbial Mats Joseph Seckbach, Aharon Oren, 2010-07-17 This book provides information about microbial mats from early fossils to modern mats located in marine and terrestrial environments. Microbial mats, layered biofilms containing

different types of cells are most complex systems in which representatives of various groups of organisms are found together. Among them are cyanobacteria and eukaryotic phototrophs, aerobic heterotrophic and chemoautotrophic bacteria, protozoa, anoxygenic photosynthetic bacteria, and other types of microorganisms. These mats are perfect models for biogeochemical processes such as the cycles of chemical elements in which a variety of microorganisms cooperate and interact in complex ways. They are often found under extreme conditions, and their study contributes to our understanding of extremophilic life. Moreover, microbial mats are models for Precambrian stromatolites; the study of modern microbial mats may provide information on the processes that may have occurred on Earth when prokaryotic life began to spread.

Microbial Mat Ecosystems Cristina M. Prieto-Barajas, 2018. Microbial mats are horizontally stratified microbial communities exhibiting a structure defined by physiochemical gradients which models microbial diversity, physiological activities, and their dynamics as a whole system. These ecosystems are commonly associated with aquatic habitats including hot springs, hypersaline ponds, and intertidal coastal zones, and oligotrophic environments, all of them harbour phototrophic mats and other environments such as acidic hot springs or acid mine drainage harbour non-photosynthetic mats. This review analyses the complex structure, diversity, and interactions between the microorganisms that form the framework of different types of microbial mats located around the globe. Furthermore, the many tools that allow studying microbial mats in depth and their potential biotechnological applications are discussed.

Bacterial Diversity and Community Structure of Lithotrophically-driven Microbial Mats from the Mariana Arc and Back-arc Kevin W. Hager, 2016. The Mariana region exhibits a rich array of hydrothermal venting conditions in a complex geological setting which provides a natural laboratory to study the influence of local environmental conditions on microbial community structure as well as large scale patterns in microbial biogeography. We used high throughput amplicon sequencing of the bacterial SSU rRNA gene from 22 microbial mats collected from four hydrothermally active locations along the Mariana Arc and back arc to explore the structure of lithotrophically based microbial mat communities in order to better assess the hypothesis that these communities represent hotspots of microbial diversity. The vent effluent was classified as iron or sulfur rich, corresponding with two distinct community types dominated by either Zetaproteobacteria or Epsilonproteobacteria, respectively. The Zetaproteobacterial based communities had the highest richness and diversity, which supports the hypothesis that Zetaproteobacteria are ecosystem engineers. The Epsilonproteobacteria dominated mats were less abundant and split into two groups based on the prevalence of the genera *Sulfurovum*, *Sulfurimonas*, or *Thioreductor*, *Lebetimonas*, which oxidize or reduce sulfur compounds, respectively. In addition, we also compare two sampling techniques showing that higher diversity in microbial mats is associated with bulk sampling compared to fine scale sampling. Overall, we present a comprehensive analysis and new insights into community structure and diversity of the lithotrophically driven microbial mats from a hydrothermal region associated with high microbial biodiversity.

Uncover the mysteries within Explore with is enigmatic creation, Discover the Intrigue in **Microbial Mats Structure Development And Environmental Significance Nato Asi Subseries G** . This downloadable ebook, shrouded in suspense, is available in a PDF format (PDF Size: *). Dive into a world of uncertainty and anticipation. Download now to unravel the secrets hidden within the pages.

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