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Microbial Ecology Electronic Resources

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Microbial Ecology Electronic Resources

Abstract
Microbial ecology covers sub-disciplines of both microbiology and ecology. To put it briefly, it is the study of the roles and relationships that microorganisms (predominantly bacteria and fungi) have with the environment and other organisms within the environment. There is much overlap in the topic areas, and often research covers several different sub-disciplines simultaneously. Major topic areas within microbial ecology are ecology, microbiology, soil science, agriculture, bioremediation, environmental science, biogeography, biogeochemistry, oceanography, restoration ecology, and dentistry/biofilm biology. Researchers and research programs cover a broad spectrum of topics; for example, molecular researchers who are interested in the metabolic processes and physiology involved in the bioremediation process. Ecologists can also use bacteria for addressing basic questions about ecological theories that can better be answered using bacteria as model populations or communities than could be answered with larger organisms and their subsequent longer generation times.

Disciplines
Collection Development and Management | Environmental Microbiology and Microbial Ecology

Comments
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Science and Technology Resources on the Internet

Microbial Ecology Electronic Resources

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Introduction

Microbial ecology covers sub-disciplines of both microbiology and ecology. To put it briefly, it is the study of the roles and relationships that microorganisms (predominantly bacteria and fungi) have with the environment and other organisms within the environment. There is much overlap in the topic areas, and often research covers several different sub-disciplines simultaneously. Major topic areas within microbial ecology are ecology, microbiology, soil science, agriculture, bioremediation, environmental science, biogeography, biogeochemistry, oceanography, restoration ecology, and dentistry/biofilm biology. Researchers and research programs cover a broad spectrum of topics; for example, molecular researchers who are interested in the metabolic processes and physiology involved in the bioremediation process. Ecologists can also use bacteria for addressing basic questions about ecological theories that can better be answered using bacteria as model populations or communities than could be answered with larger organisms and their subsequent longer generation times.
Scope

This webliography is selective, highlighting high quality, informative, and interesting microbial ecology resources. None of the peer-reviewed journals in this webliography are entirely open access; they are included here because of their importance as electronic resources in this topic area. The resources included in this webliography provide a huge amount of information on the topic that could be useful from the high school-aged student to the professional microbial ecologist, and of course a librarian looking for resources to add to a library research guide. There is a wide range of information available, including professional organizations, journal publications, web sites with background information, and blogs that can be used to learn, educate, and entertain, all on topics related to microbial ecology.

Discipline /Term Relationships

The below terms are taken from PubMed's MeSH (Medical Subject Headings)

Microbiology
  Bacteriology
    Environmental Microbiology
      Air Microbiology
      Food Microbiology
      Soil Microbiology
      Water Microbiology
    Genetics, Microbiology
    Industrial Microbiology
    Mycology
    Plant Pathology
    Virology

Library of Congress (LC) classification for Microbial Ecology. In general, microbial ecology topics are found in QR100 through QR150.

Microbial Ecology - by types of relationships
  Biofilms
  Competition
  Mats (Microbial Mats)
  Symbiosis

Microbial Ecology - by type of environment
  Extreme environments
  Air and dust
  Geomicrobiology
  Water (Aquatic) Microbiology
  Soil Microbiology
  Foods Microbiology
  Space Microbiology

Microbial degradation
Microbiological Chemistry
LC classification for **Ecology** are extensive. Most of these categories could have information pertaining to ecology and microorganisms. Ecology can be found from QH531 through QH549

### Organizations

**American Society for Microbiology (ASM)**
http://www.asm.org

In the life sciences, the American Society for Microbiology (ASM) is the largest professional society in the United States; currently the ASM has over 39,000 members. Although many of these members are indeed in the medical fields, there are thousands of members, presentations, and several journals that ASM publishes in fields outside of medical microbiology.

**Association for the Sciences of Limnology & Oceanography (ASLO)**
http://aslo.org/

Much research in aquatic environments is focused on microbial communities, and therefore on microbial ecology. Like the Ecological Society of America, the Association for the Sciences of Limnology & Oceanography (ASLO) is an increasingly important professional society amongst microbial ecologists.

**Ecological Society of America (ESA)**
http://www.esa.org/esa/

In the phrase microbial ecology, the ecology aspect is often more dominant than the microbial aspect. Indeed, the Ecological Society of America (ESA) has been quickly growing as an important society and venue for presentations and publications amongst microbial ecologists.

**Federation of European Microbiological Societies (FEMS)**
http://www.fems-microbiology.org/

The Federation of European Microbiological Societies (FEMS) is second to ASM in terms of size, and there are many microbial ecology journals with high quality research articles that are published by FEMS.

**International Society for Microbial Ecology (ISME)**
http://www.isme-microbes.org/

The International Society for Microbial Ecology (ISME) is an international society that focuses on the field of microbial ecology and its sub-disciplines. Collaboratively with Nature Publishing Group, ISME publishes *The ISME Journal*.

**Society for Applied Microbiology (SFAM)**
http://www.sfam.org.uk/

The Society for Applied Microbiology (SFAM) is likely the most visible microbiological authority in the UK, including microbial ecology.

### Peer Reviewed Journals
FEMS and ASM are the two largest societies within the microbiological sciences and constitute the most important publishers in the field. It should be noted that, as with all areas of science, the journals *Nature*, *Science*, and the *Proceedings of the National Academy of Sciences* (PNAS) are important publications for the most influential papers in microbial ecology.

**Core Journals (subscription required for most articles)**

**Applied & Environmental Microbiology** (*Appl. Environ. Microbiol.*) ISSN: 0099-2240  
http://aem.asm.org/  
Published by ASM since 1953, this is one of the top journals on the applied spectrum of microbial ecology, e.g., bioremediation, rumen microbiology, geomicrobiology.

**Aquatic Microbial Ecology** (*Aquat. Microb. Ecol.*) ISSN: 0948-3055  
http://www.int-res.com/journals/ame/ame-home/  
This journal has been published since 1995. Volumes that were published at least 5 years previous are available as open access via the journal’s homepage. The journal publishes articles on all aspects of microbial ecology that pertain to any of the various aquatic environments.

**Ecology** (*Ecology*) ISSN: 0012-9658  
http://esapubs.org/esapubs/journals/ecology.htm  
*Ecology* (not to be confused with the British Ecological Society’s *Journal of Ecology*) is a journal that covers all areas of ecology and is not focused on microorganisms. Microbial ecology articles in this journal tend to be of more interest to ecologists in general than microbiologists specifically.

**Environmental Microbiology** (*Environ. Microbiol.*) ISSN: 1462-2912  
http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291462-2920  
*Environmental Microbiology* is published by Wiley. This journal has been published since 1999, and they often publish special or themed issues.

**FEMS Microbiology Ecology** (*Fems Microbiol. Ecol.*) ISSN: 0168-6496  
http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291574-6941  
*FEMS Microbiology Ecology* publishes articles in microbial ecology. This includes not only organisms and environments in their natural state, but also in heavily managed habitats such as agriculture and restored habitats. This is different than the other FEMS journals as it is focused solely on microbial ecology instead of the more general microbiology.

**FEMS Microbiology Letters** (*Fems Microbiol. Lett.*) ISSN: 0378-1097  
http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291574-6968  
*FEMS Microbiology Letters* accepts original research articles from all areas of microbiology, which includes articles from the microbial ecology topics. Compared to the other FEMS journals, this title should not be considered essential for having a complete collection of journals in microbial ecology, because of the wide topic range and low quantity of articles published per issue.
FEMS Microbiology Reviews (Fems Microbiol. Rev.) ISSN: 0168-6445
http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%2921574-6976

FEMS Microbiology Reviews is FEMS’ most cited journal. Each issue features high quality reviews from invited authors in all sub-disciplines of microbiology, including microbial ecology. Compared to the ASM journal Microbiology & Molecular Biology Reviews, this reviews-based journal appears to have more articles from environmental and ecological topics.

The ISME Journal (ISME J.) ISSN: 1751-7362
http://www.nature.com/ismej/index.html

The ISME Journal is published by Nature Publishing Group and the International Society for Microbial Ecology. This journal has good quality articles and is published monthly.

Journal of Bacteriology (J. Bacteriol.) ISSN: 0021-9193
http://jb.asm.org/

Published by the ASM, the Journal of Bacteriology is often more focused on bacterial processes and molecular mechanisms; however, articles also cover how microbes interact with their environment.

Microbial Ecology (Microb. Ecol.) ISSN: 0095-3628
http://www.springer.com/life+sciences/microbiology/journal/248

This journal is published by Springer. As its name implies, Microbial Ecology focuses strictly on research articles that are of interest to microbial ecologists.

Microbiology & Molecular Biology Reviews (Microbiol. Mol. Biol. Rev.) ISSN: 1092-2172
http://mmb.asm.org/

Published by ASM since 1937, this is a highly cited journal, primarily because it is based on reviews as opposed to original research. There are a smaller number of articles published compared to other ASM journals, but the articles tend to be more substantial in length.

Soil Biology & Biochemistry (Soil Biol. Biochem.) ISSN: 0038-0717
http://www.journals.elsevier.com/soil-biology-and-biochemistry/

This journal publishes on a wide range of issues in soil biology, including but not limited to microbial ecology. The articles do tend to be more on the applied and analytical side of research but this does not preclude more basic research experimentation.

Systematic and Applied Microbiology (Syst. Appl. Microbiol.) ISSN: 0723-2020
http://www.journals.elsevier.com/systematic-and-applied-microbiology/

Systematic and Applied Microbiology is published by Elsevier. This journal focuses on four areas within microbiology: systematics, applied microbiology, comparative biochemistry/genomics, and ecology.

Keeping Current & Social Media
Most mailing lists in this area of research are hosted by the American Society for Microbiology (ASM). The mailing lists below that begin with "Division*" are all ASM managed; to view and post to these lists, ASM requires users to be paying ASM members. The other lists below are unrestricted.

**Mailing lists within microbial ecology:**

Division D—Microbe-Host Interactions  
Division N—Microbial Ecology  
Division Q—Environmental and General Applied Microbiology  
Division R—Evolutionary and Genomic Microbiology  
ASM Mailing Lists

ECOLOG-L  
[Ecolog Listserv Link](https://listserv.heanet.ie/cgi-bin/wa?A0=MARINE-B)

Marine Biodiversity  
[https://listserv.heanet.ie/cgi-bin/wa?A0=MARINE-B](https://listserv.heanet.ie/cgi-bin/wa?A0=MARINE-B)

**Blogs within microbial ecology:**

**Small Things Considered**  
[http://schaechter.asmblog.org/schaechter/](http://schaechter.asmblog.org/schaechter/)  
This blog is hosted by ASM. There are multiple bloggers who contribute to its content, writing on a wide range of interesting topics. The blog posts link out to resources from such locations as Wikipedia, in addition to linking to peer-reviewed literature in the field. The content is well organized into categories, found on the right side-bar, useful for locating previous blog posts on similar topics. The blog has been ongoing since November 2006.

**Lonely Spore Blog**  
This blog is thoughtful and interesting. Even though posts are bi-monthly or less frequent, it is included because of the interesting subject matter and quality of writing. The author is a researcher in microbial ecology. Topics cross over different research areas from biogeochemical cycling to discussions on the size limits of bacteria to astrobiology.

**J. Craig Venter Institute WebLog**  
J. Craig Venter has been involved with genomics research for several decades. The blog is written in a more formal style, and the posts are focused around DNA sequencing/genomics and biotechnology techniques, yet include such topics as origin of life research, mammal diseases, or recent news from the institute. The frequency of posts is sporadic and unpredictable.

**ESA Microbial Ecology SubSection**  
[http://esa.org/microbial/](http://esa.org/microbial/)  
Not a blog in the traditional sense, however this ESA section is kept up to date with useful information for the student or researcher in microbial ecology.
Nature Microbial Ecology Pages
http://www.nature.com/subjects/microbial-ecology
This web site links to portions of Nature published research and news articles that have a microbial ecology focus on them.

The Human Food Project
http://humanfoodproject.com/
This web site and project focuses on the microbial diversity and evolution of organisms found within and upon the human body. This project takes an anthropocentric viewpoint that is informative not only for microbial ecologists but also human health researchers and anthropologists. The highly interdisciplinary project and web site also tracks the co-evolution of humans with our microbial dependents that live within us.

Government & Research Institutions

Center for Microbial Ecology, Michigan State University
http://www.cme.msu.edu/
This web site is the host for much of the information from the Michigan State University program in microbial ecology. It contains information about outreach, the graduate program, as well as research being done at MSU in microbial ecology.

EPA (Environmental Protection Agency) Microbiology Resources
http://www.epa.gov/nerlcwww/microbes/epamicrobiology.html
Research done by the EPA is more often concerned with the negative impact of various environmental contaminants on human health, and this is reflected in the types of information they have on microbes and microbial ecology. For a purely environmental look at microbial ecology, the United States Geological Survey (USGS) resources may be of better value, but the information from EPA is also useful for a human perspective.

J. Craig Venter Institute
http://www.jcvi.org/cms/home/
The J. Craig Venter Institute (JCVI) is one of the top research institutes in the world. Although it is considered it to be more genomics research than necessarily microbial ecology, it should be recognized as an organization that does quality research that affects the field of microbial ecology.

Marine Biological Laboratories (MBL)
http://www.mbl.edu/
Most research at the Marine Biological Laboratories (MBL) is being done in the oceans or coastal waters; they have a microbial ecology focus on bioremediation and deep-sea vent communities.

Scripps Institution of Oceanography - Marine Biology Research Division
https://scripps.ucsd.edu/mbrd
Scripps is involved with many aspects of marine research, however the
research in microbial ecology being done at this institution spans from the roles of microorganisms within coral reef systems, to bioluminescence, to research on phytoplankton and cyanobacterial ecology. This is also an educational institution, affiliated with the University of California San Diego (UCSD).

U.S. Geological Survey (USGS) - Environment and Microbiology Research  
http://microbiology.usgs.gov/  
The USGS is heavily involved in microbial ecology research, especially concerning biogeochemical cycles and geomicrobiology; research covers diverse topics such as water resources, fish/wildlife, human health, and more. The web site has an enormous volume of research information and background information on microbial ecology.

Woods Hole Oceanographic Institution  
http://www.whoi.edu/  
This is a large institute that covers a wide range of research areas. There are a handful of microbial ecologists doing research at Woods Hole from basic community compositions, to biogeochemistry, to bioremediation.

Microbial Observatories

National Science Foundation (NSF) Microbial Observatories (MO) Funding  
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=6166  
The long-term goal of the Microbial Observatories program is to develop a network of field sites in different habitats to study and understand microbial diversity over time and across environmental gradients. The listing below is not exhaustive; it is a representation of some of the better web sites that are dedicated to their respective microbial observatories. The sites generally explain the research so that the information is accessible to non-specialists in microbial ecology, as well as being informative to the professional.

Alpine Microbial Observatory  
http://amo.colorado.edu/about.html  
This observatory examines the high altitude, low temperature environment of the Rocky Mountains, Colorado.

Carlson Microbial Oceanography Lab  
https://labs.eemb.ucsb.edu/carlson/craig/research/oceanic-microbial-observatory  
This observatory examines the oceans, specifically the Northwestern Sargasso Sea (i.e., the Atlantic Ocean, generally north of Bermuda).

Kartchner Caverns Microbial Observatory  
http://swes.cals.arizona.edu/maier_lab/kartchner/  
This observatory examines underground caves in the state of Arizona.

Methylotrophic Microbial Observatory
This observatory examines methylotroph physiology and evolution at Lake Washington, in the state of Washington.

Salt Plains Microbial Observatory
http://www.okstate.edu/artsci/SPMO/
This observatory examines the Dry Salt Plains, Northern Oklahoma.

Sapelo Island Microbial Observatory
http://ugami.uga.edu/programs/index.htm
This observatory examines the terrestrial/marine results of high organic matter and microorganisms in a predominantly estuarine environment, Georgia.

Educational Resources

Microbe Library
http://www.microbelibrary.org/
This web site provides access to extensive resources, including images, videos, standard laboratory protocols, etc., from the American Society for Microbiology (ASM). This site is probably the single best source of information for professors or instructors in any area of microbiology.

The Microbe Zoo
http://commtechlab.msu.edu/sites/dlc-me/zoo/
The Microbe Zoo is created and supported by the Michigan State University Microbial Ecology Program. The information is given at a basic introductory level, suitable to high school students or beginning level undergraduates. The images, while cartoony, are quality resources. However, there are also many microscopy images of various bacterial species.

The Virtual Museum of Bacteria
http://www.bacteriamuseum.org/
This is a thorough web site with useful information on many disciplines within microbiology, written mainly for the novice. There is also a section of “species profiles” which gives much more detailed information on about 40 bacterial species. It also provides links to additional resources on those particular species, including information from various government agencies and scholarship by researchers.

ASM Microbial Diversity Research Priorities
This report is suggesting future research directions in the field of microbial diversity research, as put forth by the American Society for Microbiology. The document gives recommendations towards specific government agencies as well as more general research trends and future directions for the field as a whole, which helps envision the future of microbiology.
Bacteria: Life History and Ecology
http://www.ucmp.berkeley.edu/bacteria/bacteria.html

The information on this web site is targeted to introduce students to the field of microbiology. It includes the basics of ecology as well as systematics and morphology of bacterial species. It also includes links to other useful sources of information.

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