

## MICROBIAL ECOLOGY TERM PROJECT

### BIOL 405

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**Objective:** The objective of this assignment is to study one facet of microbial ecology in detail. It is hoped that through the process of independent investigation, you will better understand how microbes interact with their environment, affect their ecosystems, and affect us in our everyday life, health, technological pursuits.

**Specifics:** Papers should succinctly summarize the current status of research within the chosen topic; examples will be available upon request. Papers should be no longer than 5 pages, single-spaced, 12 point font, in length (not including the References section). Each paper should include at least 5 references to primary research articles (in *addition* to review articles and/or book chapters) pertinent to the topic chosen by the student. Students will be asked to make a slide presentation of their topic, to be shared with the rest of the class during the final week of the course. Accurate, clear writing and a high quality summary of your topic are expected. We will provide you with starting material for each topic if you request it, but it is your job to research it further in the scientific literature. Take advantage of the library, PubMed, and Google Scholar. Please cite all your references appropriately.

You will be graded on both your written (up to 75 pts possible) and oral (up to 25 pts possible) presentations.

**Oral presentation:** Your presentation should clearly convey to the rest of the class the salient points of your report in a PowerPoint presentation. If you wish, augment your presentation with movies, sound effects, guest speakers... be creative! You may find technological assistance and useful tools in making a fun presentation at the Student Technology Center:

<http://www.wvu.edu/techcenter/>

Creativity of presentation, neatness and organization are all factors in your grade. However all the “glitz” in the world in a presentation will not make up for lack of content. On **May 27 & May 29**, we will devote 20 minutes of class time per week to a group presentation.

**Written review:** The paper should be, to the best of your ability, the result of your own effort to understand the topic and to synthesize current knowledge and opinion about the disease. ***Plagiarizing from texts, research reports, reviews, or news articles (i.e. without proper citation) will result in a zero on this assignment.*** All figures must have a legend. Make sure you remember that Genus name is capitalized, while species is not, and both of them are underlined or italicized (e.g. *Escherichia coli*) - even if you use the abbreviation for Genus (e.g. *E. coli*). Spelling and grammar will be graded. If you are unsure of the grammatical and overall quality of your writing, you may request help from

the Writing Center. With foresight and planning all articles can be obtained through the WWU library and /or interlibrary loan.

[http://www.acadweb.wvu.edu/writingcenter/Send\\_Paper.htm](http://www.acadweb.wvu.edu/writingcenter/Send_Paper.htm)

Microbiology journals at Western:

[http://www.library.wvu.edu/ref/subjects/piper\\_index.html](http://www.library.wvu.edu/ref/subjects/piper_index.html)

**Citations:** You should acknowledge a source any time (and every time) you use a fact or an idea that you obtained from that source. Thus, clearly, you need to cite sources for all direct quotations. But you also need to cite sources from which you paraphrase or summarize facts or ideas—whether you’ve put the fact or idea into your own words or not, you got the fact or idea from somebody else and you need to give them proper acknowledgement (even if an idea might be considered “common knowledge,” but you didn’t know it until you found it in a particular source). Sources that need to be acknowledged are not limited to books and journal articles, but include internet sites, computer software, written and e-mail correspondence, even verbal conversations with other people (in person or by telephone). All different kinds of sources must be acknowledged. Furthermore, if you use figures, illustrations, or graphical material, either directly or in modified form, that you did not yourself create or design, you need to acknowledge the sources of those figures. When you have stated some fact or figure, particular thought or quote that should be credited to its author you must cite in your text the publication from which you gained that information. **There must be agreement between the references cited in the paper and the references listed in the back reference section.** In other words, if it is cited in the paper, it must be listed in the reference section. If it is referenced, it must be cited at least once in the paper.

**Citing references in the text:** When you cite a reference in your text you should use one of the following three formats:

1) Mention the author by last name in the sentence and then give the year of the publication in parentheses, for example:

According to Rodgers (1983), the Appalachian mountains were formed in three events.

2) Give the facts or ideas mentioned by the author and then attribute these facts or ideas by putting both his or her last name and the date in parentheses:

The first of the three events occurred in the Ordovician, the second in the Devonian, and the third in the Carboniferous and Permian Periods (Rodgers, 1983).

3) Quote the author exactly—be sure to put the quoted phrase between quotation marks—and then list the author’s name, the date, and the page number in parenthesis:

“All the climaxes produced mountainous islands or highlands that shed vast amounts of debris westward to form clastic wedges or delta complexes on the continental margin.” (Rodgers, 1983, p. 229).

You only need to include the page number in the citation if you are quoting directly, or if the source is very long and the specific fact or idea you are citing can only be found on a specific page. Direct quotations that are more than 4 lines long should be set off from the rest of your paper by use of narrower margins and single spaced lines. ***In this assignment, do not use direct quotations unless absolutely necessary – please put ideas into your own words.***

If you have more than one source by the same author published in the same year, distinguish them both in the in-text citation and in the reference list, by appending the letters a, b, c... to the year, in the order in which the different references appear in your paper. (For example: Allen 1996a, 1996b.)

If the reference you are citing has two authors, use the following format:

Periods of glaciation have a large effect on sea level (Ingmanson and Wallace, 1985).

If the reference you are citing has more than two authors, use the following format:

Hot spots are formed by the drift of plates over mantle plumes (Vink et al., 1985).

If your source of information is from a personal verbal communication, you would use the following format for the first citation from that person:

It is possible to correct the raw <sup>TM</sup>D values measured on the mass spectrometer (Mark Conrad, Lawrence-Berkeley National Lab, personal communication).

Later citations to the same person can be shortened, as in:

The reproducibility of <sup>TM</sup>D determined by these methods is thought to be about +/- 2 per mil (Conrad, personal communication).

If your source of information is from written correspondence (a letter or e-mail), you would substitute the word “written” for the word “personal” above, and you would add the date of the letter (if dated). Personal communications are generally not included in the References Cited or Bibliography section, although unpublished papers, reports or manuscripts should be.

If your source of information has no individual identifiable author, use the name of the organization to which the work can be attributed in place of the author’s name:

The reference citation style described here is a version of the “Author, Date” scientific style, adapted from the Council of Biology Editors (1994).

Corporate authors are listed in full in the Reference list and in the first paper citation, with the first paper citation indicating its abbreviation, e.g. (Centers for Disease Control

and Prevention [CDC], 2001). Subsequent citations can then read (CDC, 2001); for consistency, also put the abbreviation, e.g. [CDC], in brackets after the full corporate author name in the Reference list.

For the most part, internet sites are ephemeral and you should NOT cite them. Find the references embedded in them and use those instead. Once in a while, exceptions must be made, as in the case of repositories for genomic data, or online databases supported and maintained by government agencies. But typically, these reputable sites will also provide a non-internet based reference for you to cite. For example, the RDP directs you to an appropriate reference – see if you can find it by browsing the page.

Cole, J. R., B. Chai, R. J. Farris, Q. Wang, A. S. Kulam-Syed-Mohideen, D. M. McGarrell, A. M. Bandela, E. Cardenas, G. M. Garrity, and J. M. Tiedje. 2007. The ribosomal database project (RDP-II): introducing *myRDP* space and quality controlled public data. *Nucleic Acids Res.* 35 (Database issue): D169-D172; doi: 10.1093/nar/gkl889

Thus, you might write: “as of March 2008, the number of SSU rRNA sequences in the Ribosomal Database Project was 489,840 (Cole et al., 2007)”. If such a reference were not available, just cite the website: “as of March 2008, the number of SSU rRNA sequences in the Ribosomal Database Project was 489,840 (<http://rdp.cme.msu.edu/>).

**The reference list:** In the Reference section, at the end of the conclusion, list the references that you used in alphabetical order, starting with the first author’s surname. Do not number this list. It is simply listed in alphabetical order by the last name of the first author. **All references, whether for text or figures, print copy or off the web, must be in one alphabetical listing.** Remember, this is a reference list - not a bibliography. This means ONLY dates and authors that are cited in the paper are listed in the reference section. And ONLY references listed in the reference section can be cited in the paper.)

**Books:** List all authors by last name and initials, separated by commas if there are more than two authors. Put an “and” before the last author in the list. Then put the year of publication, the title of the book (in italics if possible), the publisher, the city, and the number of pages in the book.

One author:

Gould, S. J., 1983, *Hen’s Teeth and Horse’s Toes*, W. W. Norton, New York City, 413 p.

Two or more authors:

Ingmanson, D. E. and Wallace, W. J., 1985, *Oceanography: An Introduction*, Wadsworth, Belmont, CA, 530 p.

**Chapters from a Book or Compilation:** List the author(s) of the article using the same format given above for books, then give the year, the title of the article or chapter (no quotes, italics or underlines), then the name(s) of the editor(s) of the book or compilation,

followed by “ed.” or “eds.”. Then put the title of the book (in italics if possible), the publisher, the city, and the page numbers where the article can be found:

Rodgers, J., 1983. The life history of a mountain range—Appalachians. *In*: Hsu, K. J., ed. *Mountain Building Processes.*, Academic Press, Orlando, p. 229-243.

**Scientific Research Papers:** List the author(s) of the article using the same format given above for books, then give the year, the title of the article or chapter (no quotes, italics or underlines), then the title of the journal or magazine, the volume number of the journal (do not use the publication date), and the range of page numbers where the article can be found.

One author:

Maddox, J. 1987. The great ozone controversy. *Nature* 329:101.

Two or more authors:

Vink, G. E., Morgan, W. J., and Vogt, P. R. 1985. The Earth’s hot spots. *Scientific American* 252:50- 57.

**Internet Sources:** Give the author’s last name and initials (if known) and the date of publication (or last modification). Next, list the full title of the work (e.g. the specific web page), and then the title of the complete work or site (if applicable) in italics (if possible). Include any version or file numbers, enclosed in parentheses. Most importantly, provide the full URL to the resource, including the protocol, host address, and the complete path or directories necessary to access the document. Be sure to spell this out exactly! (It’s best to use an electronic “copy” from the “location” box of your browser and “paste” into your word processor). Finally specify the date that you last accessed the site, enclosed in parentheses.

Focazio, M. J., Welch, A. H., Watkins, S. A., Helsel, D. R., and Horn, M. A. 1999. A retrospective analysis on the occurrence of arsenic in ground-water resources of the United States and limitations in drinking-water-supply characterizations. *U.S. Geological Survey Water-Resources Investigation Report 99-4279*. <http://co.water.usgs.gov/trace/pubs/wrir-99-4279/> (August 1, 2000)

Adapt these formats as necessary for other types of sources, including unpublished reports or manuscripts—just be sure to include sufficient information that your readers could find or obtain these sources themselves, if need be.