

THE GRAND CANON
SPECIALIZED BIBLIOGRAPHY SERIES

PROTISTS
AND OTHER MICROORGANISMS
of the
GRAND CANYON REGION

SECOND EDITION

EARLE E. SPAMER

RAVEN'S PERCH MEDIA • 2025

BIBLIOGRAPHY OF PROTISTS AND OTHER MICROORGANISMS
OF THE GRAND CANYON REGION

Citations are extracted from

THE GRAND CANON

A WORLDWIDE BIBLIOGRAPHY OF THE
GRAND CANYON AND LOWER COLORADO RIVER REGIONS
IN THE UNITED STATES AND MEXICO

VOLUME 1, PART B : BIBLIOGRAPHY

CATALOGERS NOTE

canon : *a standard or
essential list of works*

The Grand Canon

not The Grand Canyon



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PREFACE

CITATIONS IN THE SPECIALIZED BIBLIOGRAPHY SERIES have been extracted from Volume 1/ Part B of *THE GRAND CANON*, a far more expansive bibliography of the Grand Canyon and Lower Colorado River regions of southwestern North America. *THE GRAND CANON* is a series of publications accessible online at <https://ravensperch.org>.

The publications listed in this bibliography are specifically about protist and other “unconventional” taxa or topics that address them. Items that are not organismally focused studies, or that do not specially mention protist or other unusual taxa—for example, more broadly focused ecological investigations or studies of environmental concerns—do not appear in this special bibliography. For citations that relate to broader ecological and environmental matters, which otherwise are about the environments of this region, consult the much more comprehensive listings in Part 19 of *THE GRAND CANON*, Volume 1).

Each citation here includes an Item number (for example, 19.4217; the prefix “19.” indicates that it is from Part 19 of the much larger bibliography, *THE GRAND CANON*, Volume 1/Part B (Bibliography)); other prefixes indicate that they are sourced from other enumerated parts of the main bibliography. These Item numbers serve as serial numbers only, which uniquely identify citations throughout *THE GRAND CANON*. Numbers are assigned as citations are acquired for the bibliography, thus they do not follow in order.

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BIBLIOGRAPHY OF PROTISTS AND OTHER MICROORGANISMS OF THE GRAND CANYON REGION

A

Aescht, Erna

- 2008 19.6326 Annotated catalogue of "type material" of ciliates (Ciliophora) and some further protists at the Upper Austrian Museum in Linz, including a guideline for "typification" of species. *Denisia* (Oberösterreichischen Landesmuseums, Biologiezentrum, Linz), 23: 125-234. [See section 3.2, "Further protists", including listing (p. 187) for *Spirotrama terricola* Foissner and Foissner, from entrance to Bright Angel Trail, Grand Canyon.]
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Atkinson, T. Prescott

- 1975 19.6543 Soil microorganisms of the Grand Canyon. *Bios* (Beta Beta Beta Biological Society), 46(3) (October): 127-133. [Protozoa, bacteria, actinomycetes, fungi, algae, flagellates, naked amoebae, ciliates, testacea. "Collections were made, 19-28 May 1973, during a raft journey of the Colorado River between Lee's Ferry and Lake Meade" (*sic*).]
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B

Bamforth, Stuart S.

- 2004 19.2507 Water film fauna of micromiotic crusts of a warm desert. *Journal of Arid Environments*, 56(3) (February): 413-423. [Abstract: "Twenty-eight microbiotic crusts containing cyanobacteria, lichens and bryophytes, collected from desert soils of the Grand Canyon in northern Arizona, between Lees Ferry and Whitmore Wash in May 2000, were examined for water film fauna. Fifty-one species of ciliates, 28 of amoebae, 17 of testacea, four metazoan taxa, and a number of flagellate morphotypes were found. In the non-flagellated protozoan groups, r-selected bactivores, responding rapidly to wetting, quickly exploiting resources, and possessing efficient encysting abilities, predominated. The few nematodes were principally stylet-bearing tylenchids, feeding on fungal hyphae and moss rhizoids."]
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Banerjee, M., AND Sharma, D.

- 2004 19.6979 Regulation of phosphatase activity in Chroococciopsis isolates from two diverse habitats: effect of light, pH and temperature. *Applied Ecology and Environmental Research* (Budapest), 2(1): 71-82. [Notes (*precisely*): "Axenic cultures of the endolithic cyanobacterium Chroococciopsis the only phototroph present in the rocks of both Antarctic (from Barwick boulder) and Arizona, USA were isolated from the rocks (Courtesy Late Dr. D.D. Wynn Williams and Charles Cockles of British Antarctic Survey and Dr .Bukhard Büdel, Universitat Kaiserlautern, Germany) in the laboratory of Algal Biotechnology, Bioscience Department ,Barkatullah University Bhopal by standard microbiological techniques. The Antarctic sample came from Beacon sandstone boulder in the Linneaus Terrace (McMurdo Dry valley) on the NNE flank of the Apocalypse peak. The hot desert sample came from a sandstone endolith from Arizona Coconino, 20 Km from the Grand Canyon National Park USA."]
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F

Foissner, Ilse, AND Foissner, Wilhelm

- 1992 19.6325 The fine structure of two new hemimastigophoran flagellates related to *Spironema multiciliatum* Klebs, 1893 [ABSTRACT]. *European Journal of Protistology*, 28(3) (August 21): 340. [Includes material described from "Grand Canyon area (USA)".] [See Foissner and Foissner (1993, [ITEM NO. 19.5211](#)).]
- 1993 19.5211 Revision of the family Spironemidae Doflein (Protista, Hemimastigophora), with description of two new species, *Spironema terricola* n. sp. and *Stereonema geiseri* n. g., n. sp. *Journal of Eukaryotic Microbiology*, 40(4): 422-438. [Flagellates, Phylum Hemimastigophora Foissner, Blatterer and Foissner, 1988. See pp. 424-429, *Spironema terricola*, new species, type from "Soil from the Grand Canyon, USA (upper entrance to Bright Angel Trail)".]
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Foissner, Wilhelm

- 1994 19.6330 Die Urtiere (Protozoen) des Bodens. *Kataloge des Oberösterreichischen Landesmuseums* (Linz), New Series, 71: 169-218. [See in section 5.2, "Geißeltiere (Flagellaten)", notes of *Spironema terricola* from Grand Canyon (p. 181; Figures 64-47 [p. 182]).] [[In German.](#)]
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L

Levine, Norman D., AND Ivens, Virginia

- 1965 19.6131 The coccidian parasites (Protozoa, Sporozoa) of rodents. *Illinois Biological Monographs* (University of Illinois), (33), 365 pp. [pagination includes Plates 1-48]. [For species gathered from specimens taken at Grand Canyon, see pp. 24-25, 38-41, 43, 48-49, 57-61, 65, 67-69, 165-166; Plates 3, 6-8, 11, 13, 32.]

Levine, Norman D.; Ivens, Virginia; AND Kruidenier, Francis J.

- 1957 19.5184 New species of *Eimeria* from Arizona rodents. *Journal of Protozoology*, 4(2) (May): 80-88. [Eleven new species of intestinal parasites from rodents in Grand Canyon National Park and vicinity.]
- 1957 19.5225 *Isopora citelli* n. sp. from the rock squirrel, *Citellus variegatus utah*. *Journal of Protozoology*, 4(3) (August): 143-144. [New species of intestinal parasite. "The host rock squirrel was trapped by Dr. Hoffmeister on August 9, 1954 one-half mile from Swamp Point, near Powell Saddle, on the north rim of Grand Canyon at an elevation of 7500 feet."]

Lewis, Patrick; Northup, Diana E.; Winter, Ara S.; McIntyre, Eathan; AND Fox, Jennifer

- 2017 19.5827 Assessing microbial diversity of the Grand Canyon Parashant National Monument caves [ABSTRACT]. *In*: Seiser, Patricia E. (ed.), *NSS Convention, June 19-23, Rio Rancho, NM : Red or Green 2017*, p. 53. [National Speleological Society.] [Grand Canyon-Parashant National Monument.]

M

Margulis, Lynn, AND Chapman, Michael J.

- 2009 19.6258 *Kingdoms and domains : an illustrated guide to the phyla of life on earth*. Amsterdam and London: Academic Press, 4th ed., lxxii, 659 pp. [Under Superkingdom Prokarya, Kingdom Protocista, Subkingdom (Division) Amitrochondria, Pr-13 Hemimastigota, see p. 164, illustration and note, *in passing*, of "*Spironema terricola* . . . found as yet only in soil from the Grand Canyon, USA." This refers to the species named by Foissner and Foissner (1993, [ITEM NO. 19.5211](#)).]

McIntyre, Eathan

- 2013 19.4219 Grand Canyon-Parashant NM. *Inside Earth* (U.S. National Park Service, Cave and Karst Programs), 16(1): 10-11. [Studies begin on cave-adapted microbes, Grand Canyon-Parashant National Monument.]
-

S

Sommerfeld, Milton R.; Crayton, Wayne M.; AND Crane, Nancy L.

- 1976 19.1518 *Survey of bacteria, phytoplankton and trace chemistry of the lower Colorado River and tributaries in the Grand Canyon National Park.* Tempe, Arizona: Arizona State University, *Colorado River Research Program, Technical Report 12* (Grand Canyon National Park, Colorado River Research Series, Contribution 40), 136 pp. (National Technical Information Service PB 267731/AS.)
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