

THE MICROBIAL TAXONOMIST

A Newsletter Published by the Bergey's Manual Trust

Welcome from the President of BISMIS

Brian Austin

There was a recent observation of a possible new species of ghost-like octopus that was found in the deep sea off Hawaii. The video, which was posted on the BBC Web page in March 2016, was fascinating, but raised the question in my mind as to whether the octopus could be considered as a typical or atypical member of its species – was it a HMO (Hypothetical Median Organism) or an outlier? Similar questions go through my mind when I read many articles describing new bacterial taxa with descriptions that are based on the examination of single cultures – is this culture really an HMO or an outlier? The answer will not be apparent until multiple cultures of the taxon have been studied. Of course, not all bacteria may be cultured, and an increasing number have been described purely on the basis of DNA studies. ‘*Candidatus*’ is a topical example – many of these are chlamydia-like organisms associated with pathological conditions, especially epitheliocystis in fish.

Then there is the question mark over the value of cultures, especially those that have been stored



for many years – are they really representative and do they have comparative value in taxonomic studies? It is realised that many bacteria change rapidly as they are taken from their natural environment and cultured on laboratory media. Bacteria in the marine environment may be observed to be extremely small, coccoid, and have tremendous metabolic potential. However all too often, culturing leads to morphological and physiological changes, i.e. the cells appear to be

bigger and less active in the laboratory. It is speculative if this represents the loss of genes, such as from plasmids, or the switching-off of genes that are not needed for bacterial survival in a nutrient-rich laboratory environment. It is conceivable that culturing leads to the selection of cells better capable of growth on laboratory media at the expense of wild-type cells that might have different nutritional and physiological needs. Furthermore, we work on the assumption that cultures comprise clones of identical cells whereas the reality is very different with populations/colonies of bacteria mutating, swapping and/or effectively sharing genes, i.e. there is variation within the genetic potential of cells within a pure culture. Another issue surrounds the mathematical/computer methods used to analyse the data. In short, we are embracing the most modern techniques in taxonomy, e.g. sequencing of the 16S rRNA gene, while relying on older mathematical methods. Are these methods still appropriate – and which is best – in the twenty first century? These issues are among the topics to be discussed at BISMIS 2016.

I hope to see you there in Pune for BISMIS 2016!

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What's new with Bergeys Manual of Systematics of Archaea and Bacteria?

Barny Whitman

Last year was one of tremendous activity around Bergeys, and a number of important milestones were achieved. Perhaps most importantly, John Wiley & Sons completed the conversion of the 2nd Edition of Bergey's Manual of Systematic Bacteriology to the new online format used by the Wiley Online reference works.

This required the complete reformatting of over 1,750 articles and 7000 pages of text and over a thousand tables and figures. An enormous achievement, it was only accomplished with the help of an excellent group of copyeditors at SPi. In addition, changes were made to the format of the Wiley Online Reference Works to accommodate the hierarchical organization used by the Manual. We are grateful to Liz Grainge for guiding the Manual through this process. This new electronic resource has been retitled Bergeys Manual of Systematics of Archaea and Bacteria or BMSAB and will be the scaffold for revisions and future additions to the Manual.

The enhanced functionality of the online BMSAB makes it a wonderful tool for research and education. Similar to *the* Manual of Systematic Bacteriology, descriptions of taxa are arranged hierarchically so it can be navigated with a Taxonomic Outline encompassing the entirety of the prokaryotes. Navigation is also accomplished by extensive links between chapters and search functions. Chapters are available as HTML or PDF files and contain links to open source references, PubMed, and the Wiley Online Library. Descriptions also have links to StrainInfo for sources of the type strains and links to GenBank for gene and genome sequences. Explore

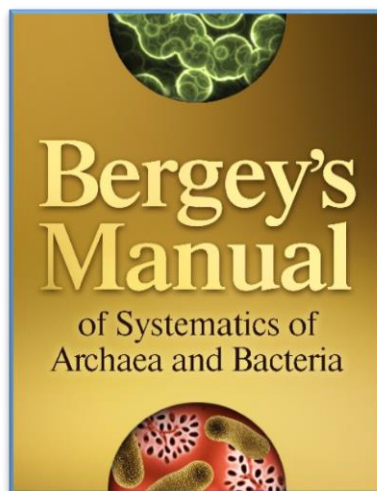
these new features at www.wileyonlinelibrary.com/ref/bergeysmanual.

Last year, we also commissioned the first 200 new chapters, many of which are currently being copyedited and should be online in the BMSAB soon. One of the great advantages of the online Manual is that we can now publish chapters soon

after acceptance. Thus, it is realistic to imagine that the Manual could become current with the new discoveries in systematics and descriptions of new taxa. We have also introduced a formal review system for manuscripts, and we greatly appreciated the experts for their service as reviewers. Our goal is to be the source of the finest descriptions of prokaryotic taxa, and the reviewers have contributed greatly.

We have also been able to recruit a great team of Associate Editors to help with the BMSAB. In addition to returning editors from the Manual of Systematic Bacteriology Dan Brown, Hans-Jürgen Busse, Richard D. Castenholz, Bruce J. Paster, Ken-Ichiro Suzuki and Naomi Ward, we have some great additions to our team in John P. Bowman, Frank O. Glöckner, Aharon Oren, Anna-Louise Reysenbach, William Wade, and Annick Wilmotte. We are fortunate to have so many excellent scientists help on the Manual.

In addition to their editors, authors will probably correspond with Chloe Satchell-Cobbett, our Publishing Assistant at Wiley. She is the point person for contact between authors, editors and Wiley. While she is very nice, she does get upset if you don't include your Bergeys ID with your correspondence

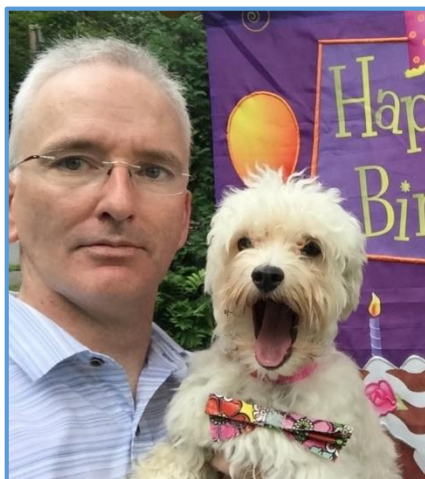


List of Prokaryotic names with Standing in Nomenclature update

Aidan C. Parte, Owner/Curator LPSN.

I took over LPSN when Jean Euzéby retired in July 2013 after my time as Managing Editor of Bergey's Manual had ended. I was honored to be entrusted with the LPSN by Jean as he had built up LPSN since 1987 into an incredibly useful resource for anyone interested in prokaryotic nomenclature and classification.

My initial task was to reformat the site to use Cascading Style Sheets, which enabled me to tidy up the HTML code and make the workflow more efficient, and also enables easy site-wide style changes in the future. I retained the basic colors of the previous version but added sidebars for navigation. I established a new workflow that involves using EndNote, Microsoft Word and Excel, FileMaker Pro (database) and BBEdit (text editor) applications to extract and manipulate bibliographic data from PubMed and contents lists kindly provided by the IJSEM Editorial Office. In addition, etymologies of names and culture collection and sequence accession numbers need to be extracted manually from papers in IJSEM and effective publications in other journals. I also added the source of type strains to entries in LPSN, and I have been recording names of parent taxa in my database - this should prove valuable in future for the classification pages (see below).



The LPSN team: Aidan (left) and Alex Parte

As you can imagine all this is very time consuming and I am constantly improving my processes to make this more efficient. One major change that I made to file structure was to move all the taxa files (3000+) out of their lettered directories (e.g. *Caldicellulosiruptor* was in the C directory) and change all the internal links. This was quite challenging, and I was concerned about the automatic redirects to the new location not working – however, it turned out well and has resulted in great improvements to efficiency in production.

In May 2015, I attended a GenBank Microbial Genomic Taxonomy Workshop at the NCBI in Bethesda, MD, USA which was interesting. It was great to catch up with old colleagues and forge links with new ones, such as Sean Turner at NCBI, who deals with a lot of

the same issues that I do, and Pablo Yarza at Ribocon. In fact, Pablo and I have been collaborating since the meeting on a major upgrade to the classification pages on LPSN, which are amongst the most popular pages on the site, but which have not been updated by myself. Pablo has been working on a new database infrastructure that will automate updates to the classification pages and eventually we're hoping to be able to automate the whole workflow to as great an extent as possible, which would allow me to devote more time to developing LPSN features and earning income from other sources.

In June 2015, I added StatCounter to every page of LPSN in order to monitor usage of LPSN as a whole and to gain insight into where users are coming from and going to within LPSN, and which external links they are using, for example. I was very relieved to discover that LPSN was still being heavily used après Jean! Between 18 June 2015 and the time of writing, today, 11 May 2016, there have been 1.25 million page views (number of times pages have been visited), 604,000 unique visits (based purely on a cookie, this is the total of the returning visits and first time visits - a total count of visits), and 173,000 returning visits (based purely on a cookie, if this

person is returning for another visit an hour or more later).. Apart from the homepage, the most popular pages overall are the classification page “Classification of domains and phyla - Hierarchical classification of prokaryotes” (<http://www.bacterio.net/-classifphyla.html>) and the “Approved Lists of Bacterial Names” (<http://www.bacterio.net/-alintro.html>); as expected, the general index pages such as lists of all names and lists of genera and taxa above the rank of genus are also popular. By country, 21% of visitors are from the USA, followed by Japan (8.5%), China (6.5%), Korea (6.5%), the UK (5.5%) and Germany (5%); there is a long tail of users from Spain to Swaziland to small Caribbean islands. Users link out

from LPSN to valid and effective publications either directly or via DOI links, to GenBank sequences, StrainInfo and DSMZ catalog entries; links to the latter were added to assess the usage of such links as a potential income stream for LPSN.

In October 2015, I added a PayPal donation button to LPSN to solicit financial support from the many users of the site as demonstrated by StatCounter; to date only eight users have donated a total of \$245. While I am extremely grateful to those generous few, it is nevertheless rather demoralising when the usage of LPSN is so high. Of course, this situation is not unique to LPSN.

Apart from the development work with Pablo, I am looking to get LPSN fully

up-to-date (there have been some delays recently due to additional recoding of the site to further improve the HTML and to fix thousands of links that were broken when IJSEM changed its online platform, and domestic commitments), and then to offer subscription-only services on top of the freely available content, and to link out to other culture collections with the aim of earning a fee from resulting sales of cultures.

Finally, I would like to thank Barny Whitman and Bergey’s Manual Trust for their ongoing moral and generous financial support, and the Microbiology Society for its support via a subscription to IJSEM and its helpful editorial office staff.



Elizaveta Bonch-Osmolovskaya receives 2016 Bergey Award
Svetlana Dedysh

The Trustees of Bergey's Manual recently voted to present the 2016 Bergey Award to Professor Elizaveta Bonch-Osmolovskaya, Winogradsky Institute of Microbiology, Research Center of Biotechnology of the Russian Academy of Sciences, Moscow, Russia. The Bergey Award has been presented since 1979 in recognition of outstanding contributions to the systematics and taxonomy of prokaryotes. In addition to a cash prize of \$2000, the award includes paid travel to an international meeting. Prof. Bonch-Osmolovskaya will be

attending the 16th International Symposium on Microbial Ecology (ISME16) in Montreal, Canada this August. The nomination of Prof. Bonch-Osmolovskaya for the Bergey Award reads:

Elizaveta Bonch-Osmolovskaya is nominated for the 2016 Bergey Award for her contributions to the systematics and genomics of thermophilic prokaryotes. She heads the Laboratory of Hyperthermophilic Microbial Communities at Winogradsky Institute of Microbiology. She is one of the internationally

recognized leaders in the field of diversity, ecology and metabolism of thermophilic prokaryotes. Together with colleagues, Elizaveta Bonch-Osmolovskaya has described many new taxa of thermophilic prokaryotes including those of high level (families, orders, phyla). She has been especially successful in isolation and description of thermophilic prokaryotes with unusual types of catabolism – lithoautotrophs, anaerobes and microorganisms using diverse inorganic electron acceptors.

Elizaveta Bonch-Osmolovskaya received her undergraduate degree in Microbiology from Moscow State University (1973) and joined the research team of distinguished Russian microbiologist, Academician George A. Zavarzin at the Winogradsky Institute of Microbiology, Russian Academy of Sciences. Further work in Zavarzin's laboratory

determined her scientific interest in hyperthermophilic microbes. She received her Ph.D degree in 1979 and defended her Doctoral dissertation in 1994. Her highly enthusiastic and successful research on thermophilic prokaryotes, discovery of many previously unknown groups of microbes and the use of genomics for exploring the metabolic potential of the newly described thermophiles attracted many students, followers and foreign colleagues. Currently, Prof. Bonch-Osmolovskaya is heading one of the largest laboratories of the Winogradsky Institute of Microbiology, which includes 14 research scientists and 7 Ph.D students. She has authored or coauthored over 200 publications, led numerous national and international projects, and organized a number of exciting expeditions to terrestrial and submarine hydrothermal areas. She is a member of the International

Advisory Boards of the Thermophiles and Extremophiles Congresses. In 2014, she was a Chair of the Organizing Committee of 10th Congress on Extremophiles in Saint Petersburg, Russia.

Prof. Bonch-Osmolovskaya received Morrison Rogosa Award of the American Society for Microbiology in 2004 and the Winogradsky Award of the Russian Academy of Sciences in 2012. In 2006-2012, she was a member of the ISME Board and has been an elected member of the American Academy of Microbiology since 2012. In 2008-2013, Prof. Bonch-Osmolovskaya served as an editor of Central European Journal of Biology and as a Guest Editor of Current Opinions in Microbiology in 2015. At present, she is a member of the editorial board of the journal Mikrobiologiya.

Nominations sought for The Bergey Medal

The Bergey Medal is awarded in recognition of outstanding and life-long contributions to the field of systematics of Bacteria and Archaea. Nominations may be submitted at any time to the Bergey's editorial office at bergeys@uga.edu. Nominations should include a cover letter summarizing the candidate's qualifications, the significance of their contributions to the systematics of prokaryotes, and their curriculum vitae.



2015 Bergey's Manual T-Shirt Design Contest

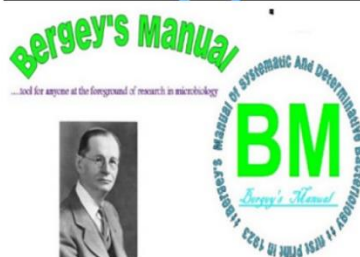
Taiwo Akinyemi

"Taiwo, Bergey's Manual would like to offer its authors a custom-designed T-shirt as a souvenir, in appreciation of their hard work", Barny Whitman said. "Okay", I replied wondering what kind of craziness was afoot. Dr. Whitman continued, "We want the design on the T-shirt to be created by a microbiologist or just anyone, so can you work on it? "Yes, of course", I gladly replied realizing that a great bit of craziness was afoot.

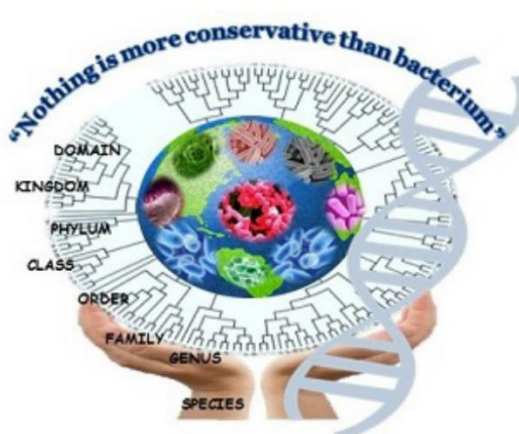
This was the conversation that birthed the 2105 Bergey's manual T-shirt design contest. The contest was open by 23rd November, 2015 and an advert was sent to undergraduate and graduate

students at the University of Georgia, to members of BISMIS, and placed on the Bergey's website. Contestants were referred to both the Bergey's Manual Trust and Wiley website for ideas. Creativity was greatly encouraged and there weren't any restrictions on T-shirt color and style. Submissions of design graphics file was made to bergeys@uga.edu. The prize for the contest was \$150 and a T-shirt with their design. At the deadline – 15th January, 2016, we received five excellent entries. Their designs, in whole or in part are below, the complete designs can be found at our website www.bergeys.org.

Mandar Rasane



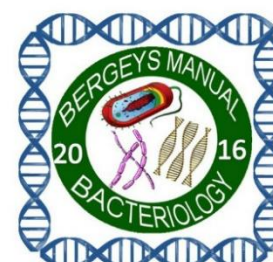
Aabeejeet Nandkumar Pansare
Microbial Culture Collection,
National Center for Cell Science,
Pune, India



Winner!!!

Priya Neurgaonkar

CSIR-National Chemical Laboratory,
India



*Happiness & Bacteria have one thing
in common; they multiply by dividing!*

Dharmender Gupta

Microbial Culture Collection,
National Center for Cell Science,
Pune, India

The winning design was decided by the trustees of Bergey's Manual, and Miss Priya Neurgaonkar declared as the contest winner. Miss Priya Neurgaonkar has a Masters degree in Microbiology from University of Pune, Maharashtra, India and currently works as a Senior Project Fellow on "Bio-prospecting of micro-organisms" for the past one year and half at National Collection of Industrial Microorganisms (NCIM) Division, Council of Scientific and Industrial Research (CSIR)-National Chemical Laboratory (NCL) Pune, Maharashtra, India.

The custom-design T-shirts are now in production and will be sent to author's upon acceptance of their manuscripts. It will also be available for sale to interested individuals or labs.

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Bergey's International Society for Microbial Systematics (BISMiS)

Full Membership Application Form

The Society invites applications for full membership from any person who is interested in the subject of microbial systematics and holds a bachelor's degree in microbiology or a related subject.

The annual dues are US\$ 50.00. Members are entitled to receive the online *Bergey's International Society for Microbial Systematics Bulletin*, which is published twice a year, and the online Bergey's Manual Trust Newsletter *The Microbial Taxonomist*. Full members will also receive a reduced registration fee for attendance of meetings. Memberships will be renewed on 1 January of each year. Unless indicated

otherwise, applications received before 1 November will be credited to the current year. Applications received after 1 November will become effective the following year. Return the form with payment to: **BISMiS, Bergey's Manual Trust, 527 Biological Sciences Building, The University of Georgia, Athens, GA 30602-2605, USA**

Alternatively, please join BISMiS online using our secure credit card facility at www.bismis.org.

First name: _____ Initial(s): _____ Last name: _____

Title: _____ Email address: _____

Mailing address

Street: _____

City: _____

State and Zip/Post Code: _____

Country: _____

Phone no. incl. Country/Area Code: _____

Highest degree: _____ Year received: _____ Subject: _____

Degree-granting institution: _____

Current position: _____

Applicant's signature: _____

Membership dues

Full member US\$ 50.00

Full member two years US\$ 100.00

Full member five years US\$ 200.00

Lifetime US\$ 500.00

Institutional US\$ 1000.00

This is a renewal: Yes or No

Amount paid

Credit card no.: _____ Name on card: _____

Card type: _____ Expiry date (mm/yy): _____ Card ID (CVV2/CID) No.: _____

Checks in US\$ should be payable to: Treasurer, Bergey's International Society for Microbial Systematics.

Bergey's International Society for Microbial Systematics (BISMiS)

Student Membership Application Form

The Society invites applications for student membership from any person who is interested in the subject of microbial systematics and is enrolled in undergraduate or graduate studies in microbiology or a related subject.

The annual dues are US\$ 30.00. Student members are entitled to receive the online *Bergey's International Society for Microbial Systematics Bulletin*, which is published twice a year, and the online Bergey's Manual Trust Newsletter *The Microbial Taxonomist*. Full members will also receive a reduced registration fee for attendance of meetings. Memberships will be renewed on 1 January of each

year. Unless indicated otherwise, applications received before 1 November will be credited to the current year. Applications received after 1 November will become effective the following year. Return the form with payment to: **BISMiS, Bergey's Manual Trust, 527 Biological Sciences Building, The University of Georgia, Athens, GA 30602-2605, USA.**

Alternatively, please join BISMiS online using our secure credit card facility at www.bismis.org.

First name: _____ Initial(s): _____ Last name: _____

Title: _____ Email address: _____

Mailing address

Street: _____

City: _____

State and Zip/Post Code: _____

Country: _____

Phone no. incl. Country/Area Code: _____

Degree in progress (BS, BA, MS or PhD, etc): _____ Subject: _____

Degree-granting institution: _____

Head of Department*: _____

**Head must write a brief supporting letter verifying that the student is in their department, and it must accompany the application. For online applications, please send letter to the address above or by email to bergeys@uga.edu.*

Applicant's signature: _____

Membership dues

Student member US\$ 30.00

Student member two years US\$ 60.00

This is a renewal: Yes or No

Amount paid

Credit card no.: _____ Name on card: _____

Card type: _____ Expiry date (mm/yy): _____ Card ID (CVV2/CID) No.: _____

Checks in US\$ should be payable to: Treasurer, Bergey's International Society for Microbial Systematics.