

16th International Symposium on Microbial Ecology

16. mednarodni simpozij mikrobne ekologije - ISME 16

21. - 26. avgust 2016, Montréal, Kanada

Srečanja ISME potekajo redno že vse od 1977, leta 1986 pa je srečanje gostila tudi Ljubljana. 16. mednarodni simpozij ISME, ki je letos potekal v Montrealu v Kanadi, je privabil kar 2106 udeležencev iz 53 držav. V okviru simpozija se je zvrstilo šest plenarnih predavanj, čemur je sledilo kar 29 različnih sekcij s predstavitvami posterjev tekom treh dni. Udeleženec simpozija si je lahko dnevno izbral eno izmed sedem ali osem simultano potekajočih sekcij, ki so pokrivalo izjemno širok nabor mikrobne ekologije od evolucije, modeliranja mikrobnih interakcij, pregleda novih in obstoječih metabolnih poti pri mikroorganizmov in habitatov, ki jih le-ti naseljujejo, (meta) genomike, interakcij med mikrobi in gostitelji, biogeokemijskih ciklov, napredka v programskih orodjih za obdelavo ekoloških podatkov, novih metod ter inovativnih postopkov bioremediacije.

Največji mikrobiološki inkubator na svetu je postal Mehiški zaliv po nesreči leta 2010, ko je prišlo do iztekanja nafte v ocean. Mikrobo v oceanu/okolju lahko analogno primerjamo s stanjem v ozračju. Klima predstavlja neko povprečno stanje, npr. povprečno mikrobno abundanco ali diverzitetu, medtem ko vreme predstavlja trenutno stanje v ozračju; podobna dnevna nihanja opažajo tudi pri mikrobih. Zanimivo, ko v morju umre celica diatomeje, le-ta sprosti prosto v okolje kar 75% raztopljenega organske snovi (DOM), če je v njeni okolici 10^6 bakterij na ml, če pa je gostota bakterijskih celic njeni v okolici 10^7 pa znaša delež sproščenega DOM v morje le 5%. V morju živi tudi cianobakterija *Prochlorococcus*, najbolj abundanten fotosintetski organizem na zemlji (10^{27} celic). Za mikrobno ekologijo predstavlja izjemen izziv proučevanje metaviroma v tem in ostalih naravnih okoljih.

Globalne klimatske spremembe se bodo vedno bolj izrazito kazale tudi v globalnem mikrobiomu, še zlasti v hladnih okoljih. Spremembe v mik-

robiomu kanadskega javorja, ki ga uporabljajo za pridobivanje sirupa, predstavlja za lokalno kanadsko gospodarstvo precejšen problem. Za kriomikrobiologijo in astrobiologijo predstavlja velik izziv razvoj sekvencijskega detekcijskega sistema (angleško, biosignature detection sequencing device), ki bi v realnem času odkril prisotnost življenja. Izziv je tudi aseptično vzorčenje v takšnih okoljih, npr. vrtnanje skozi ledeni pokrov na Antarktiki do enega izmed 400 spodaj ležečih jezer. Vsekakor se je treba še veliko naučiti od mikrobov v ekstremnih habitatih, kot je npr. *Planococcus halocryophilus*, ki raste v širokem temperaturnem razponu od minus 25 do plus 35°C. Čeprav je v puščavah nizka mikrobna diverziteta, z izjemo arhej, obstajajo hipolitični kremenasti habitat (prepuščajo le 0,05 do 5% svetlobe) s primarnimi producenti, ki so pomembno gonilo mikrobne dinamike v tem okolju.

Prst niti ni tako gostoljuben mikrobni habitat kot se zdi na prvi pogled, saj je le 0,1 do 1% organskega ogljika dostopnega za mikrobni metabolizem. Proučevanje ekologije prsti je pomembno tudi pri kmetijski proizvodnji, npr. prisotnost nekaterih praživali izrazito pospeši rast določenih kultivarjev. Z intenzivno rabo zemlje so povezane tudi emisije N_2O , ki ima kar 300-krat večji toplogredni učinek kot CO_2 . Njegove emisije iz prsti se lahko enostavno zniža s povišanjem pH tal na 7.

Vedno večji pomen se v mikrobni ekologiji pripisuje številnim kometaboličnim in medvrstnim interakcijam. Precej raziskovalnih skupin po svetu se zato ukvarja z odkrivanjem novih in sklopljenih metabolne poti, npr. sklopljena fototrofna fiksacije ogljika z istočasno redukcijo železa ali oksidacija $Fe(II)$ z istočasno redukcijo nitrata. Zanimivo interakcijo predstavlja bakterijski endosimbionti (*Wolbachia*), ki usmerja razvoj spola pri vinski mušici (*Drosophila*).

Primer evolucije v laboratoriju opazujejo v poskusu, ki neprekinjeno poteka že vse od leta 1988, ko dnevno v izbrano gojišče precepljajo 12 populacij *Escherichia coli*. Do sedaj imajo že 65000 generacij. V poskusu so ugotovili, da se postopoma izboljšuje fitnes organizma, prihaja pa tudi do veliko nesinonimnih mutacij zlasti v genih za metabolizem in regulatorne funkcije. V tem času je prišlo tudi do izgube 1,4% začetnega genoma. Po 30000 generacijah se je pojavila mutacija, ki omogoča izrabo citrata; ta subpopulacija postaja nova vrsta.

Farmacevtski pripravki v okolju predstavljajo prav poseben izziv. Npr. bioremediacija odpadnih voda, ki vsebujejo farmaceutvske pripravke, bi morala obvezno vključevati filtracijo in ločeno obdelavo te vode, da se izognemo širjenju antibiotskih rezistenc. Vendar pa, kot poročajo, je mikrobnih rezistenc v okolju splošno prisoten in zelo star. To so podkrepili s primerom jame Lechugilla (ZDA), kjer so v jamskem mikrobiomu odkrili rezistenčne gene brez zunanjega (človekovega) vnosa antibiotikov.

Številna bolezenska stanja pri ljudeh danes že pripisujejo človeškemu mikrobiomu. Danes je že znano, da človeški intestinalni mikrobiom z nizko diverzitetno pomeni slabo za naše zdravje. Mikrobi v prebavilih pomembno sodelujejo pri regulaciji imunskega sistema, odstranjevanju toksinov ter preko metabolitov komunicirajo tudi z ostalimi organi, npr. z živčnim sistemom in možgani. V posebnem kemostatu lahko kultivirajo že 90% črevesne mikrobiote. To brozgo so poimenovali tekoče zlato (angleško, liquid gold), saj na podlagi predhodnih spodbudnih rezultatov že izvajajo transplantacijo mikrobioma zdravih ljudi (angleško, fecal transplant) v ljudi, ki jih pestijo težave, vezane na prebavo, npr. pseudomembranozni kolitis, ki ga povzroča bakterija *Clostridium difficile*.

Novi predsednik združenja mikrobnih ekologov z dvoletnim mandatom je postal Colin Murrell iz Velike Britanije. Naslednji simpozij ISME 17 bo v Leipzigu v Nemčiji, za tem pa se leta 2020 srečanje seli v Južnoafriško republiko.

Janez Mulec

INSTRUCTIONS FOR AUTHORS

1. Types of Articles

SCIENTIFIC ARTICLES are comprehensive descriptions of original research and include a theoretical survey of the topic, a detailed presentation of results with discussion and conclusion, and a bibliography according to the IMRAD outline (Introduction, Methods, Results, and Discussion). In this category ABS also publishes methodological articles, in so far as they present an original method, which was not previously published elsewhere, or they present a new and original usage of an established method. The originality is judged by the editorial board if necessary after a consultation with the referees. The recommended length of an article including tables, graphs, and illustrations is up to fifteen (15) pages; lines must be double-spaced. Scientific articles shall be subject to peer review by two experts in the field.

REVIEW ARTICLES will be published in the journal after consultation between the editorial board and the author. Review articles may be longer than fifteen (15) pages.

BRIEF NOTES are original articles from various biological fields (systematics, biochemistry, genetics, physiology, microbiology, ecology, etc.) that do not include a detailed theoretical discussion. Their aim is to acquaint readers with preliminary or partial results of research. They should not be longer than five (5) pages. Brief note articles shall be subject to peer review by one expert in the field.

CONGRESS NEWS acquaints readers with the content and conclusions of important congresses and seminars at home and abroad.

ASSOCIATION NEWS reports on the work of Slovene biology associations.

2. Originality of Articles

Manuscripts submitted for publication in *Acta Biologica Slovenica* should not contain previously published material and should not be under consideration for publication elsewhere.

3. Language

Articles and notes should be submitted in English, or as an exception in Slovene if the topic is very local. As a rule, congress and association news will appear in Slovene.

4. Titles of Articles

Title must be short, informative, and understandable. It must be written in English and in Slovene language. The title should be followed by the name and full address of the authors (and if possible, fax number and/or e-mail address). The affiliation and address of each author should be clearly marked as well as who is the corresponding author.

5. Abstract

The abstract must give concise information about the objective, the methods used, the results obtained, and the conclusions. The suitable length for scientific articles is up to 250 words, and for brief note articles, 100 words. Article must have an abstract in both English and Slovene.

6. Keywords

There should be no more than ten (10) keywords; they must reflect the field of research covered in the article. Authors must add keywords in English to articles written in Slovene.

7. Running title

This is a shorter version of the title that should contain no more than 60 characters with spaces.

8. Introduction

The introduction must refer only to topics presented in the article or brief note.

9. Illustrations and Tables

Articles should not contain more than ten (10) illustrations (graphs, dendrograms, pictures, photos etc.) and tables, and their positions in the article should be clearly indicated. All illustrative material should be provided in electronic form. Tables should be submitted on separate pages (only horizontal lines should be used in tables). Titles of tables and illustrations and their legends should be in both Slovene and English. Tables and illustrations should be cited shortly in the text (Tab. 1 or Tabs. 1-2, Fig. 1 or Figs. 1-2; Tab. 1 and Sl. 1). A full name is used in the legend title (e.g. Figure 1, Table 2 etc.), written bold, followed by a short title of the figure or table, also in bold. Subpanels of a figure have to be unambiguously indicated with capital letters (A, B, ...). Explanations associated with subpanels are given alphabetically, each starting with bold capital letter (A), a hyphen and followed by the text.

10. The quality of graphic material

All the figures have to be submitted in the electronic form. The ABS publishes figures either in pure black and white or in halftones. Authors are kindly asked to prepare their figures in the correct form to avoid unnecessary delays in preparation for print, especially due to problems with insufficient contrast and resolution. Clarity and resolution of the information presented in graphical form is the responsibility of the author. Editors reserve the right to reject unclear and poorly readable pictures and graphical depictions. The resolution should be 300 d.p.i. minimum for halftones and 600 d.p.i. for pure black and white. The smallest numbers and lettering on the figure should not be smaller than 8 points (2 mm height). The thickness of lines should not be smaller than 0.5 points. The permitted font families are Times, Times New Roman, Helvetica and Arial, whereby all figures in the same article should have the same font type. The figures should be prepared in TIFF, EPS or PDF format, whereby TIFF (ending *.tif) is the preferred type. When saving figures in TIFF format we recommend the use of LZW or ZIP compression in order to reduce the file sizes. The photographs can be submitted in JPEG format (ending *.jpg) with low compression ratio. Editors reserve the right to reject the photos of poor quality. Before submitting a figure in EPS format make sure first, that all the characters are rendered correctly (e.g. by opening the file first in the programs Ghostview or GSview – depending on the operation system or in Adobe Photoshop). With PDF format make sure that lossless compression (LZW or ZIP) was used in the creation of the *.pdf file (JPEG, the default setting, is not suitable). Figures created in Microsoft Word, Excel, PowerPoint etc. will not be accepted without the conversion into one of the before mentioned formats. The same goes for graphics from other graphical programs (CorelDraw, Adobe Illustrator, etc.). The figures should be prepared in final size, published in the magazine. The dimensions are 12.5 cm maximum width and 19 cm maximum height (width and height of the text on a page).

11. Conclusions

Articles shall end with a summary of the main findings which may be written in point form.

12. Summary

Articles written in Slovene must contain a more extensive English summary. The reverse also applies.

13. Literature

References shall be cited in the text. If a reference work by one author is cited, we write Allan (1995) or (Allan 1995); if a work by two authors is cited, (Trinajstić and Franjić 1994); if a work by three or more authors is cited, (Pullin et al. 1995); and if the reference appears in several works, (Honsig-Erlenburg et al. 1992, Ward 1994a, Allan 1995, Pullin et al. 1995). If several works by the same author published in the same year are cited, the individual works are indicated with the added letters a, b, c, etc.:

(Ward 1994a,b). If direct quotations are used, the page numbers should be included: Toman (1992: 5) or (Toman 1992: 5–6). The bibliography shall be arranged in alphabetical order beginning with the surname of the first author, comma, the initials of the name(s) and continued in the same way with the rest of the authors, separated by commas. The names are followed by the year of publication, the title of the article, the international abbreviation for the journal (periodical), the volume, the number in parenthesis (optional), and the pages. Example:

Mielke, M.S., Almeida, A.A.F., Gomes, F.P., Aguilar, M.A.G., Mangabeira, P.A.O., 2003. Leaf gas exchange, chlorophyll fluorescence and growth responses of *Genipa americana* seedlings to soil flooding. *Experimental Botany*, 50 (1), 221–231.

Books, chapters from books, reports, and congress anthologies use the following forms:

Allan, J.D., 1995. *Stream Ecology. Structure and Function of Running Waters*, 1st ed. Chapman & Hall, London, 388 pp.

Pullin, A.S., McLean, I.F.G., Webb, M.R., 1995. Ecology and Conservation of *Lycaena dispar*: British and European Perspectives. In: Pullin A. S. (ed.): *Ecology and Conservation of Butterflies*, 1st ed. Chapman & Hall, London, pp. 150-164.

Toman, M.J., 1992. Mikrobiološke značilnosti bioloških čistilnih naprav. Zbornik referatov s posvetovanja DZVS, Gozd Martuljek, pp. 1-7.

14. Format and Form of Articles

The manuscripts should be sent exclusively in electronic form. The format should be Microsoft Word (*.doc) or Rich text format (*.rtf) using Times New Roman 12 font with double spacing, align left only and margins of 3 cm on all sides on A4 pages. Paragraphs should be separated by an empty line. The title and chapters should be written bold in font size 14, also Times New Roman. Possible sub-chapter titles should be written in italic. All scientific names must be properly italicized. Used nomenclature source should be cited in the Methods section. The text and graphic material should be sent to the editor-in-chief as an e-mail attachment. For the purpose of review the main *.doc or *.rtf file should contain figures and tables included (each on its own page). However, when submitting the manuscript the figures also have to be sent as separate attached files in the form described under paragraph 10. All the pages (including tables and figures) have to be numbered. All articles must be proofread for professional and language errors before submission.

A manuscript element checklist (For a manuscript in Slovene language the same checklist is appropriately applied with a mirroring sequence of Slovene and English parts):

English title – (Times New Roman 14, bold)

Slovene title – (Times New Roman 14, bold)

Names of authors with clearly indicated addresses, affiliations and the name of the corresponding author – (Times New Roman 12)

Author(s) address(es) / institutional addresses – (Times New Roman 12)

Fax and/or e-mail of the corresponding author – (Times New Roman 12)

Keywords in English – (Times New Roman 12)

Keywords in Slovene – (Times New Roman 12)

Running title – (Times New Roman 12)

Abstract in English (Times New Roman 12, title – Times New Roman 14 bold)

Abstract in Slovene – (Times New Roman 12, title – Times New Roman 14 bold)

Introduction – (Times New Roman 12, title – Times New Roman 14 bold)
Material and methods – (Times New Roman 12, title – Times New Roman 14 bold)
Results – (Times New Roman 12, title – Times New Roman 14 bold)
Discussion – (Times New Roman 12, title – Times New Roman 14 bold)
Summary in Slovene – (Times New Roman 12, title – Times New Roman 14 bold)
Figure legends; each in English and in Slovene – (Times New Roman 12, title – Times New Roman 14 bold, figure designation and figure title – Times New Roman 12 bold)
Table legends; each in English and in Slovene – (Times New Roman 12, title – Times New Roman 14 bold, table designation and table title – Times New Roman 12 bold)
Acknowledgements – (Times New Roman 12, title – Times New Roman 14 bold)
Literature – (Times New Roman 12, title – Times New Roman 14 bold)
Figures, one per page; figure designation indicated top left – (Times New Roman 12 bold)
Tables, one per page; table designation indicated top left – (Times New Roman 12 bold)
Page numbering – bottom right – (Times New Roman 12)

15. Peer Review

All Scientific Articles shall be subject to peer review by two experts in the field (one Slovene and one foreign) and Brief Note articles by one Slovene expert in the field. With articles written in Slovene and dealing with a very local topic, both reviewers will be Slovene. In the compulsory accompanying letter to the editor the authors must nominate one foreign and one Slovene reviewer. However, the final choice of referees is at the discretion of the Editorial Board. The referees will remain anonymous to the author. The possible outcomes of the review are: 1. Fully acceptable in its present form, 2. Basically acceptable, but requires minor revision, 3. Basically acceptable, but requires important revision, 4. May be acceptable, but only after major revision, 5. Unacceptable in anything like its present form. In the case of marks 3 and 4 the reviewers that have requested revisions have to accept the suitability of the corrections made. In case of rejection the corresponding author will receive a written negative decision of the editor-in-chief. The original material will be erased from the ABS archives and can be returned to the submitting author on special request. After publication the corresponding author will receive the *.pdf version of the paper.