



WORLD FEDERATION FOR CULTURE COLLECTIONS Newsletter (No.52)–DECEMBER 2012

NEWS FROM THE PRESIDENT



The state of our World Federation for your Culture Collection

Dear Colleagues, Dear WFCC members, Dear friends,

Since ICC-12 in Brazil, the renewed WFCC Executive Board has proactively contributed to enhance the visibility of the culture collections and to a better understanding of the socio-economic role of culture collections.

Thanks to the dedicated work of Dr Ipek Kurtböke, WFCC Vice-President, publisher of the [WFCC Newsletter](#), I can now present you an interactive view of the latest achievements of your Federation.

At the dawn of 2013, I am very proud as WFCC President and on behalf of the Executive Board, to present you some of the most significant achievements. Building on decades of experience, individual and group of collections have launched several initiatives and have approached international bodies to enhance the visibility of WFCC.

Since the infancy of microbiology, scientists struggle to ensure long term *ex situ* conservation of living microbial material for further uses. This specialised work essential

to build microbiological research on firm ground is performed by our culture collections (CC). Our mission is to provide facilitated access to technically and legally fit-for-use microbiological resources of consistent quality with regard to the material itself as well as related data.

While in the past, culture collections were essentially seen and run as centres of conservation and distribution of microbiological material, we are conceived now as the sources of all essentials for Research and Development in Life Sciences (i). To fulfil our role of basic infrastructure for biosciences in Knowledge Base Bio-Economy (ii), we must implement quality management system in a constant search for improvement of our management and scientific expertise (iii).

Most individual CC have limited funds and personnel; the appropriate strategy to meet the challenges is to combine our strength into more or less structured networks, at national, regional and international level.

Such functional networking requires:

- I. Adapted Information & Communication Technology capacities to optimise collaboration;
- II. Minimal quality standards and technical level to facilitate scientific cooperation;
- III. Compatible policies regarding Intellectual Property Rights management as required by the TRIPS Agreement (iv), and material distribution and information in accordance with the provisions of the Nagoya Protocol to the Convention on Biological Diversity (CBD) (v).

I. To provide for ICT facilities and tools is the mission of the World Data Centre for Micro-organisms (WDCM).

We are currently more than 625 culture collections in 71 countries registered in the culture collections directory: the CCINFO database. The WDCM team under Dr Juncai Ma leadership has improved and increased the information contained in CCINFO. We invite all culture collections to visit [CCINFO](#). You can check and update your data by requesting your own username and password at [CCINFO USERNAME & PASSWORD](#),



mentioning your title, your position and contacts information for crosscheck.

The WDCM website is a key communication tool of the culture collections community. It intends to become a key instrument for microbiologists, "one-stop-shop" portal where scientists can find microbial resources and related information. The [website](#) has been completely redesigned to include many new applications; including the possibilities to contribute to the contents by [providing news](#) from your collections and [pictures of your holdings](#).

The increasing demands on culture collections for authenticated, reliable biological material and associated information have paralleled the growth of biotechnology. In the WFCC guidelines, it is pointed out that collections should publish online or printed catalogue regularly to disseminate information of strains to promote scientific and industrial usages of holdings. However, according to the statistics, only nearly one-sixth of collections registered in CCINFO have their online catalogue, which greatly hinders the visibility and hence the accessibility of strains.

WDCM has started constructing a data management system and a global catalogue to help organize, unveil and explore the data resources of its member collections. The WFCC [Global Catalogue of Microorganisms](#) is expected to be a robust, reliable and user-friendly system to help culture collections to manage, disseminate and share the information related to their holdings. It also provides a uniform interface for the scientific and industrial communities to access the comprehensive microbial resource information. You can join this initiative by [contacting us](#) and explaining your needs and expectations. Joining this initiative will enable you to use tools such as the [Analyzer of Bio-resources Citations](#). Also, if you don't have a catalogue yet, WDCM can help you organise your data and build your own catalogue, as well as your website.

At the same time, WDCM, Dr Gerard Verkleij, WFCC Executive Board Secretary, and Dr Vera Weihs, WFCC treasurer, propose you a [WFCC membership](#) that will offer multiple opportunities. We need your support to further develop our community. Thank you to join WFCC and become a member, thank you for renewing your membership.

II. WFCC is committed to facilitate cooperation between culture collections; including by setting minimal quality standards and technical level.

The WFCC Executive Board has recently updated the [WFCC Guidelines](#) for the establishment and operation of Collection of Cultures of Microorganisms. The objective is to provide recommendations for culture collections to reach minimal quality standards and technical level to facilitate their operation. Similar know-how level will also ease scientific cooperation within the culture collections community as well as with microbiologists at large.

The dissemination of the WFCC guidelines at local level reinforces the awareness, and improves the communication among members locally and abroad. The translation of the WFCC guidelines into national languages will thus reinforce the culture collections community at the global level. This is why the original English text has been translated in different languages, in a "Think globally, act locally" strategy.

At the initiative of Dr Gladys Martos in Argentina and other South American colleagues the **Spanish** version is now available on the website.

The **Korean** version of the WFCC guidelines has been published thanks to Prof. Hong and Prof. Yonhee Lee and their staff, respectively from KACC and KNRRC. Both versions can be downloaded from the website.

Versions in Russian, German, Chinese and Japanese are in the making. I invite more members to follow these examples and to translate the WFCC guidelines into their language of operation. Strong national and regional communities make WFCC more effective.

III. To propose feasible solutions to implement the legal requirements is the role of your federation.

Culture Collections operate in an increasingly complex legal environment. The workload and costs involved "to keep biological diversity in safe and expert hands" cannot be underestimated. We must implement in an efficient way, and at affordable cost, the diverse international, supra-national, and national laws and regulations.

Development of services and products based on exploitation of microorganisms can generate profits subordinated to the [Nagoya Protocol](#) on Access and Benefit Sharing to the Convention on Biological Diversity (CBD). On the other hand, agreements ruling Intellectual



Property Rights need to be also taken into consideration, such as the TRIPS Agreement, and the Budapest Treaty (vi) administrating the patenting procedure for inventions including or using micro-organisms.

WFCC has been involved in designing compatible policies regarding Intellectual Property Rights management as required by the TRIPS. Already 15 years ago, in collaboration with the World Intellectual Property Organization (WIPO), WFCC Members affiliated to ECCO (European Culture Collections Organisation) have developed a [Code of Practice](#) for International Depository Authorities referred to in the WFCC Guidelines.

Concerning the implementation of the Nagoya Protocol, the MOSAICC code of conduct developed since 1999 at the initiative of WFCC members is seen as a major contribution by both CBD (vii) and WIPO (viii). Most recently, at the initiative of NITE BRC Japan, at the occasion of its 10th Anniversary in December 2012, an international team of experts met to discuss how to optimize and to revisit MOSAICC and similar guidelines to build a Transparent & Users friendly Science & Technology system of transfer, as sector based guidelines for the Nagoya Protocol. WFCC Guidelines also recommend that all members use Material Transfer Agreement (MTA) (ix).

Societal concerns about biosafety (x) and biosecurity (xi) have highlighted the role of Culture Collections as safe, secured and reliable sources of microbiological material. Dr Christine Rohde is a prominent expert in biosafety. Dr Gerard Verkleij and Dr Joost Stalpers from CBS have developed an extended Code of Conduct on biosecurity in the framework of the European project EMbaRC (xii).

In complement, Prof. Kevin McCluskey represents WFCC in the activities of the [Global Taxonomy Initiative](#) set up in the framework of the CBD. He advocates the importance of microorganisms as primary components of biodiversity. He emphasizes the need for support to microbial taxonomy and explains the role of culture collections because comprehensive exploration and structured study of microbial diversity implies access to huge numbers of specimens. These assets of fundamental scientific importance must be conserved and provided with the highest level of reliability to ensure consistent research and knowledge build-up. Long term *ex situ* conservation of living microbial material for further uses is essential to build microbiological research on firm ground.

The outcomes of these various initiatives represent a set of coherent and complementary tools. WFCC contributes to build transparent, safe and sustainable handling of microbial diversity worldwide.

During 2012, I have personally witnessed the vitality of culture collections in the world. I encourage you to communicate and write about your successes, and to contribute to [your](#) Newsletter!

On behalf of all WFCC Executive Board members, I wish you all the best for 2013.

I hope to meet you at [ICCC-13](#), in Beijing, from 23 to 27 September, to discuss the future challenges and build new initiatives.

Sincerely yours,

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- (i) The concept of Biological Resource Centres (BRC) was thought up as early as 1946, at UNESCO, on the set up of the MIRCEN - Microbial Resources Centres Network – program, to establish microbial resource centres in developing countries and to strengthen several threatened treasure houses of microbial diversity through mutual support within a network. In 1999, the Organization for Economic Co-operation and Development Working Group on BRC initiated the development of the concept into the 21st century, pointing out the crucial roles of BRCs for human life and the biosphere, underlining the necessity to provide the adequate support to enable the BRCs to meet the increasing challenges of biodiversity and genomics. While the emphasis was previously put on the biological resources conserved in specialized facilities, at present a BRC is conceived as a functional unit having all the necessary components to study, preserve and use biological diversity. It integrates appropriate



- infrastructure, human, financial and technical resources, skills related to information production, processing and diffusion as well as legal, administrative, management and quality control systems. See document Biological Resource Centres Underpinning the future of Life Sciences and Biotechnology. OECD Science & Information Technology, May 2001, vol. 2001, no.7, pp.1-68 (69 pages) OECD. <http://www.oecd.org/dataoecd/26/19/31685725.pdf>
- (ii) KBBE can be concisely defined as “transforming life sciences knowledge into new, sustainable, eco-efficient and competitive products”. “Knowledge based” refers to the increasing amount of data on biological material produced as research outputs, and processed by analytical tools, which themselves generate even more data and metadata to be managed and analysed by powerful computational tools. The term “bio-economy” includes all industries and economic sectors that produce, manage and exploit biological resources (agriculture, food, pharmaceutical, cosmetic, and other bio-based industries). Advanced biotechnology is breaking new ground in understanding microbial diversity and bio-processes that could lead to valuable bio-products and bio-materials. Applying such new knowledge to the production and conversion of bio-resources can boost bio-economy and create new industries. See New Perspectives on the Knowledge-Based Bio-Economy, Conference Report, European Commission, Brussels, 2005. See also http://ec.europa.eu/research/biosociety/kbbe/basics_en.htm
- (iii) See recommendations in document: OECD Best Practice Guidelines for Biological resource Centre, 2007, OECD, Paris. <http://www.oecd.org/dataoecd/6/27/38778261.pdf>
- (iv) Agreement on Trade-Related Aspects of Intellectual Property Rights. The TRIPS Agreement is Annex1C of the Marrakesh Agreement Establishing the World Trade Organization, signed in Marrakesh, Morocco on 15 April 1994. Article 27.3.b states that micro-organisms not be excluded from patentability, in other words, that they can be patented. See World Trade Organisation website <http://www.wto.org>
- (v) After 10 years of negotiation, the Nagoya Protocol on Access and Benefit Sharing (ABS) was adopted by the Conference of the Parties of the Convention on Biological Diversity (CBD) on 30 October 2010. The objective of this Protocol is to implement the principles imbedded in articles 15 and 8(j) of the CBD. The Protocol rules the fair and equitable sharing of the benefits arising from the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of benefit.
- (vi) Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure. Combined with the Regulations Under the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure. <http://www.wipo.int/treaties/en/registration/budapest/>
- (vii) See <http://www.cbd.int/abs/instruments/>
- (viii) See <http://www.wipo.int/tk/en/databases/contracts/texts/bccm.html>
- (ix) MTA is a generic term that includes very short shipment document, simple delivery notice, standard invoice containing minimal standard requirements, or more detailed specific contract including tailor-made mutually agreed terms. All these documents can be designated as MTA as long as they set the rules covering a transfer of biological material between providers and users. Like OECD, WFCC recommends the use of MTA See recommendations about MTA in MOSAICC at <http://bccm.belspo.be/projects/mosaicc/d/code2009.pdf> and the core MTA model issued by the European Culture Collection Organisation at <http://www.eccosite.org/>
- (x) “Biosafety” refers to the containment principles, technologies and practices that are implemented to prevent unintentional exposure to pathogens and toxins, or their accidental release.
- (xi) “Biosecurity” refers to institutional and personal security measures designed to prevent the loss, theft, misuse, diversion or intentional release of pathogens, or part of them, and toxin-producing organisms, as well as such toxins that are held, transferred and/or supplied by BRCs (OECD definition page 44 in OECD (2007) Best Practice Guidelines for Biological Resources Centers. OECD Directorate for Science, Technology and Industry).
- (xii) EMbaRC is a 3 years (2009-2012) EU project funded under the 7th Framework Programme. It aimed to improve, coordinate and validate microbial resource centres delivery to European and International researchers from both public and private sectors. See www.embarc.eu



UPDATES OF INFORMATION ON THE CONVENTION ON BIOLOGICAL DIVERSITY IN 2012

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The 11th meeting of the Conference of the Parties (COP11) was held in Hyderabad, India from 8 to 19 October 2012, back-to-back with the sixth meeting of the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol on Biosafety (COP-MOP6) from 1 to 5 October 2012.

At the COP11 the delegates concluded 33 decisions, which include resource mobilization for implementation of the Strategic Plan for Biodiversity, Status of the Nagoya Protocol and various programmes related to capacity building for Parties. Using a baseline figure of the average annual national spending on biodiversity between 2006 and 2010, developed countries indicated that they would double biodiversity-related international financial flows by 2015. The COP also set targets to increase the number of countries that have included biodiversity in their national development plans, and prepared national financial plans for biodiversity, by 2015. The COP reaffirmed the need for enhanced technical and scientific cooperation among countries, while underlining the potential for enhanced cooperation among developing countries. To support such efforts, a new National Biodiversity Strategies and Action Plans Forum (NBSAP Forum) was launched at COP11 by UNEP, CBD, The Global Environment Facility (GEF) and the UN Development Programme (UNDP). Governments also provided guidance to the preparations for the entry into force of the Nagoya Protocol and agreed that a third meeting of the Intergovernmental Committee for the Nagoya Protocol will be needed in the upcoming two years. Capacity building to effectively implement the Protocol as well as achieving Aichi Biodiversity Targets attached to the Strategic Plan for Biodiversity, scientific and technical cooperation and technology transfer will be taking place

through the series of regional workshops and training modules. In relation to taxonomic capacity building the COP adopted the Capacity-building Strategy for the Global Taxonomy Initiative (annex to decision XI/29). Participation of every culture collection to this process will be welcomed by Parties and it is widely needed to take actions through international collaboration among those Parties (developing and developed), other Governments and relevant organizations. The full report of COP11 is accessible at <http://www.cbd.int/doc/decisions/cop-11/full/cop-11-dec-en.pdf>.

At the COP-MOP6 the delegates agreed to convene a group of experts to further clarify the issue of socioeconomic considerations and to conduct further research and exchange information and experiences on the issue. Agreement was also reached on a number of other complex issues, including risk assessment, response actions in event of unintentional movement of LMOs across national borders and types of documentation accompanying shipments of LMOs. Delegates commended the progress made in the development of "Guidance on Risk Assessment of Living Modified Organisms" by a group of experts and encouraged Parties to test the guidance in actual cases of risk assessment and share their experiences. The delegates also agreed on an improved plan of action on capacity-building to support the implementation of the Protocol and adopted further steps to strengthen the Biosafety Clearing-House – an online information exchange facility under the Protocol. The report of COP-MOP6 is accessible at <http://www.cbd.int/doc/meetings/bs/mop-06/official/mop-06-18-en.pdf>

The 67th session of the United Nations General Assembly has recognized the importance of recent decisions adopted by the Conference of the Parties to the Convention on Biological Diversity (CBD). The extensive references to the CBD and the results of its eleventh meeting of the Conference of the Parties (COP 11) in the resolutions of the General Assembly (resolutions A/C.2/L.27 and A/C.2/L.58 as adopted on 21st December, 2012) demonstrate the increasing recognition of the importance of the conservation and sustainable use of biodiversity for sustainable development. The General Assembly also invited parties to the Convention on Biological Diversity to ratify or accede to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization, so as to ensure its early entry into force and its implementation.



THE BIOSECURITY CODE OF CONDUCT FOR BRCS – A DEVELOPMENT AND PROGRESS REPORT

C. Rohde, D. Smith and J. Stalpers

The ECCO XXXI Meeting (14th/15th June 2012) took place in Braga, Portugal, a wonderful spot on the earth. The theme of this successful meeting addressed “Closing the gap between science and society”, a well-selected though most challenging topic. There are gaps to be closed – one is the Biosecurity Code of Conduct for BRCs and indeed, we are very close to implementation. A roundtable was dedicated to the Code’s development and current progress.

A fundamental biosecurity publication under the EMBO (European Molecular Biology Organization) *Science & Society* programme was “A Hippocratic Oath for life scientists” by James Revill & Malcolm Dando in 2006: (EMBO reports 7, S55-S60). It reflects best what a Code of Conduct on biosecurity should expect from the life sciences. The European collection community have been active in this arena publishing “Restricted distribution of dual-use goods” in the series of *EBRCN Information Resources* (see WFCC website www.wfcc.info). To stress the dual-use issue, this EBRCN information resource was published again in 2007 as short version in order to reach a broader community. At the same time, in 2007, the *OECD Best Practice Guidelines on Biosecurity for BRCs* was released (OECD 2007, rights@oecd.org) covering all possible issues relevant for culture collections in the biosecurity context. It includes qualitative risk assessment and risk management practices considering the special and global role of culture collections and considering their special responsibilities in the complex and ever-changing legislative world. When the OECD BRC Initiative was created, it soon aimed at developing a biosecurity Code of Conduct. At that time, in the first decade of the 21st century, several Codes of Conduct or ethical Codes were developed (e.g., IUMS Code of Ethics, <http://www.iums.org/index.php/code-of-ethics>).

During an inaugural meeting in October 2010, the principles of the Code were designed by a group of members of EMbaRC and GBRCN; a workshop was planned to finalize and agree on the Code. Two major milestones followed: a Workshop was held in Utrecht

(hosted by the Centraalbureau voor Schimmelcultures - CBS) in September 2011 under the auspices of the EMbaRC and GBRCN projects to discuss and agree the draft Code. Three months later, the Code was presented to the United Nations on the occasion of the 7th Review Conference to the Biological and Toxin Weapons Convention - BTWC (UN, Geneva, December 2011): where we were invited to introduce the Code along with a NGO statement (one of only 18 invited statements). The UN States Party delegates welcomed the Code as a “model Code of global relevance” pointing out that bottom-up AND top-down processes are a prerequisite for a “living” and long-lasting Code of Conduct for biosecurity with strong outreach potential (see previous WFCC Newsletter article).

Unfortunately, the BTWC is not comparable to the Chemical Weapons Convention - CWC, the CWC being much stronger. Chemical (and nuclear) weapons had been a topic decades earlier. The dual-use problem in the bio-sciences context includes regulations that were not originally part of the non-proliferation policies, but of biosafety (health, containment, quarantine etc.) regulations. Therefore, Codes of Conduct seem the only realistic way to raise awareness, to self-regulate activities where necessary.

Since 2001, several different Codes have been developed in the bio-sciences, but they did not have a strong biosecurity focus. Now, ten years later, we have the chance to demonstrate our will to strengthen the BTWC. Also, the Code co-developed with the EU CBRN Action Plan for protecting Europe against highly hazardous (CBRN = Chemical, Biological and RadioNuclear) substances. The detailed procedural document to accompany the Biosecurity Code of Conduct for BRCs will help as a guide to implement the seven key issues of the Code, it will be ready to be circulated soon (contact: C. Rohde, DSMZ; D. Smith, CABI; J. Stalpers; CBS).

For implementing the Code, culture collection “A” must not necessarily take the same measurements as culture collection “B” or “C”: we all have and want to keep our special character, holdings, research, infrastructure, management etc. The Code will NOT restrict us. It will be best practice, not more but also not less. During ECCO XXXI, there was a clear sign given by the attending collections’ audience that the implementation of the Code will be supported. The coming MIRRI project will further have a focus on biosecurity and will help develop a risk assessment database. See www.embarc.eu for a copy of the Code.



NEWS FROM MEMBERS

The Russian Collection of Alkanotrophs: current situation and future perspectives

Prof. Dr. Irina Ivshina,

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*Perm State National Research University, Professor,
Russia*

If we compare the Manual of Bacteria with a map of a poorly explored continent in the depth of which an explorer would often find waves of sandy dunes rather than anticipated rocky ridges, then a collection of living cultures is a developed coast from where all journeys to uncharted areas begin.

During the rapid development of the global bioeconomy, greater attention is paid to the formation, strengthening and development of specialized “next-generation” microbial collections which are centres for conservation of both microbial cultures and extensive scientific information on their properties and potential applications in various biotechnological fields.

One of the specialized nodes in the intensively growing network of microbial depositaries is the Regional Specialized Collection of Alkanotrophic Microorganisms (acronym IEGM, WFCC#768, [www/iegm.ru/iegmcol](http://www.iegm.ru/iegmcol)). It is an integral part of the appropriate laboratory at the Institute of Ecology and Genetics of Microorganisms, Ural Branch of the Russian Academy of Sciences (Perm, Russia). It was created on the basis of the author’s collection of hydrocarbon-oxidizing cultures (including those utilizing higher gaseous methane homologues C₂–C₄) initiated in 1975 with regard to exploration of this group of microorganisms in predicting oil-and gas presence and environmental pollutions.

IEGM collection activity focuses on biotechnology needs and aims at studying and maintaining non-pathogenic actinobacteria with highly active oxygenases, enzymes involved in oxidation of natural and anthropogenic hydrocarbons. The concept of the collection of alkanotrophs was formulated in view of the fact that

Perm Krai is one of the prospective oil-and gas-producing regions in the Russian Federation, while recovery of natural hydrocarbons is associated with ecological problems, including oil contamination.

The collection comprises over 2,000 pure identified and fully characterized strains isolated from many thousands of soil, rhizosphere, surface and stratal water, snow, air, and core samples collected in ecologically and geographically contrasting regions of the former Soviet Union during many-year research expeditions and field investigations (**Fig. 1**).



Fig. 1. Geographical distribution and isolation sources of bacterial cultures

The most represented among the collection cultures are extremotolerant forms (psychroactive strains with a wide temperature range; halo-, baro-, osmo-, xero-, acido- and alkalotolerants) of industrial significance; strains-bioproducers of amino acids, enzymes, lipids with high non-saturated fatty acid contents, vitamins, and biosurfactants; strains-biodegraders of ecopollutants, including crude oil and oil products. The Collection includes strains of genera *Agromyces*, *Arthrobacter*, *Brachybacterium*, *Brevibacterium*, *Clavibacter*, *Corynebacterium*, *Curtobacterium*, *Dermacoccus*, *Dietzia*, *Gordonia*, *Kocuria*, *Microbacterium*, *Micrococcus*, *Mycobacterium*, *Nocardia*, *Nocardoides*, *Rhodococcus*, *Terrabacter*, *Williamsia* (altogether 86 actinobacterial species).

Rhodococcus bacteria are of special interest as predominant components in natural populations of hydrocarbon-oxidizing microorganisms and constitute the core part of IEGM collection (**Fig. 2**). *Rhodococcus* strains are characterized by marked emulsifying and biodegrading potential toward individual hydrocarbons and oil products; increased resistance to heavy metal salts as well as by long-term activity under extreme acidity and salinity of the environment.

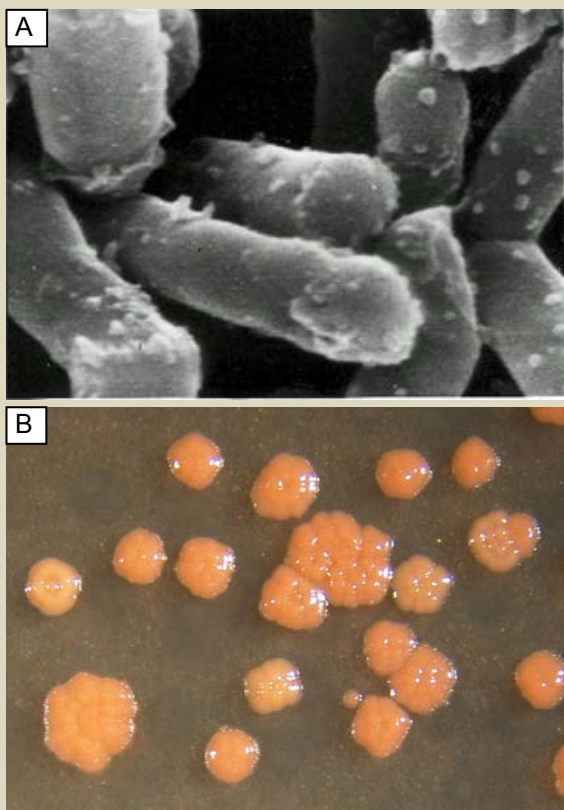


Fig. 2. Scanning electron micrographs of cells (A x 44,000) and *Rhodococcus ruber* IEGM colonies (B x10) grown with propane in the agarized mineral medium

With the high scientific and commercial significance of rhodococci and based on IEGM collection, a *Rhodococcus* center is being currently established at the premises of the Perm State National Research University (www.psu.ru).

Thoroughly studied structural and physiological peculiarities of the collection strains allowed for developing optimal cryoconservation and lyophilization regimes for cultures with pre-induced alkanotrophic exchange. Specific cryoprotectors, including *Rhodococcus* biosurfactants have been devised. The predicted efficient duration of bacterial viability is determined in the range of 20 to 40 years.

IEGM collection is incorporated in the network of Russian specialized microbiological non-medical collections (Consolidated Catalogue of Microbial Cultures Held in Russian Non-medical Collections. CD version, release 1.0 (Fall 2002), www.vkm.ru), and registered (September 1996) with WFCC (<http://www.wfcc.nig.ac.jp/index.html>) and ECCO (<http://www.eccosite.org>). IEGM collection has designed

an electronic database operating in the Oracle and supported by an interactive search system. This information resource provides input and support of both typically formalizable information on strains as formatted files and specific functional information on biological properties, ecological confinement and biotechnological potential of microorganisms in the form of tables, diagrams, figures and micrographs. Furthermore, the created database has links to relevant international information resources.

The collection stock review is carried out once in two years using up-to-date methods of polyphasic taxonomy. These are summarized in **Fig. 3** showing the limits of their taxonomic resolution.

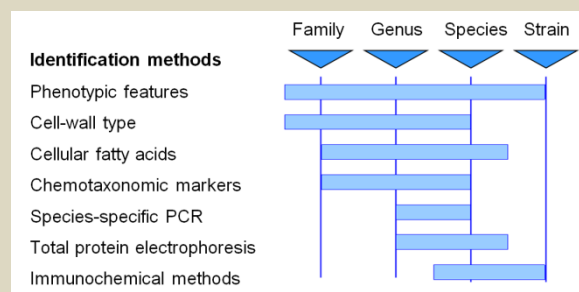


Fig. 3. Taxonomic resolution limits of bacterial characterization and identification methods employed in IEGM collection

The first hard-copy issue of the catalogue of strains (both Russian and English versions) was published in 1994 (Eds. Nauka, Moscow), and the recent electronic version appeared in 2010.

Fig. 4 shows sample catalogue information available to public access (www.iegm.ru/iegmcol).

¹ – Valid genus/species name of bacteria; ² – authors who described and re-described the species, year of validation; ³ – collection acronym; ⁴ – strain accession number in the collection; ⁵ – an individual or organization from where the strain was acquired; strain accession number upon acquisition; ⁶ – isolation substrate; ⁷ – geographical location of the strain isolation site; ⁸ – nutrient medium; cultivation temperature; conservation and storage methods; ⁹ – references to publications where this strain was used.

The collection has a qualified staff of 15 full-time employees with taxonomic expertise and practice in adequate storage/conservation of collection cultures, and skilled in handling alkanotrophs (**Fig. 5**).



***Rhodococcus ruber*¹ (Kruse 1896) Goodfellow and Alderson 1977^{AL2}**

IEGM³ 231⁴

<- I.B. Ivshina, IEGM, OEGM 29-1B-1⁵. **Isolated from:** water, spring⁶, Olkhovski oil-extracting enterprise, Perm region, Russia⁷. **Taxonomy/description:** (55, 95, 97, 245)⁸. Shows positive result with *Rhodococcus ruber* primers in species-specific PCR (245)⁹. **Properties:** uses propane and *n*-butane as sole carbon source (95)⁸; produces biosurfactants when growing on *n*-alkanes C₁₂-C₁₇ (74, 248, 254)⁸; degrades high-porous ceramic materials (237)⁸; degrades paracetamol (265)⁹; forms cholesterol oxidase; resistant to Cd²⁺, Mo⁶⁺, Ni²⁺, Pb²⁺, VO²⁺, VO₃⁻, VO₄³⁻; accumulates molybdenum and nickel (286)⁹. (Medium 5 or 8, 11; 28°C; F-3, L-2, S-4)⁸.

Medium: 5, 8, 11

Reference(s): 55, 74, 95, 97, 237, 245, 248, 252, 253, 254, 257, 258, 261, 263, 264, 265, 267, 268, 269, 271, 275, 277, 286, 294

Fig. 4. Sample catalogue information



Fig. 5. The only way to establish and to maintain a sustainably functioning collection is the creative labor of its research staff

The users of IEGM collection are various national and foreign higher educational establishments and research institutions, experts in microbiology, biotechnology, ecology and medicine, industrial engineers and technicians, lecturers and students. For educational purposes, the cultures are free. The IEGM strains and the accumulated biological information find their application in the educational activities at Microbiology and Immunology Chair, Perm State National Research University.

Short-term courses for researchers organized at the collection facilities provide training in methods of isolation, cultivation, and identification of hydrocarbon-oxidizing bacteria. Pupils from municipal biology and ecology lyceums, students and undergraduates of Perm

State National Research University and also PhD students of the Institute of Ecology and Genetics of Microorganisms carry out research work using IEGM collection facilities. The *lyceum – classical university – postgraduate studies* “chain” ensures that we have opportunities to quest for people devoted to collection activities.

The programme of successive activities relevant to study and conservation of the collected bacterial resources includes *basic* research (comprehensive study of alkanotrophic biodiversity *in/ex situ*; adaptation mechanisms of their survival in anthropogenically disturbed ecosystems) and *collection-relevant activities* (adequate acquisition of natural material; classification and taxonomic characterization of isolates; evaluation of their biotechnological applications; development of methods for long-term storage of cultures and their functional diversity; upgrading of information on cultures according to international standards, and continuous supply of strains and relevant information), and also *applied* research using the collection resources, and promotes their application in various biotechnology fields (Fig. 6).

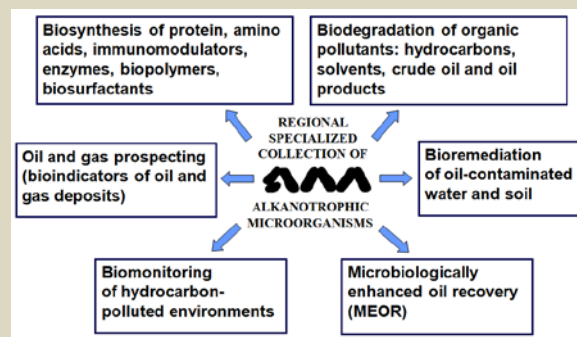


Fig. 6. IEGM Collection: fields of application

Application of the collection biotechnological potential requires cooperative interaction of experts in different fields. Using IEGM collection resources, joint interdisciplinary projects are performed involving mathematicians, physicists, pharmacists, and chemists. This makes it possible to go beyond the field of our research (beyond the bounds of microbiology itself) and contributes to the solution of many basic and applied issues.

Bioresources of the collection of alkanotrophs are actively employed as research objects in federal and international programs, including the 7th Framework



Programme carried out with colleagues from Belgium, Italy, and Switzerland (**Fig. 7**).



Fig. 7. The International meeting of the BRIO Project partners, 7th Framework Programme (October 09–12, 2012. Saratov, Russia)

To exemplify, the collection bioresources were used to obtain an effective organic carrier for immobilized cells (RF Patent 2298033) to design laboratory-scale stable polyfunctional biocatalysts enhancing the production of novel materials and biologically active compounds; a biopreparation of a novel formulation and novel (oleophilic) form useful for oil-contaminated soil clean-up under cold environments (RF Patent 2180276); a unique method for *Rhodococcus* biosurfactant production (J. Microbiol. Methods. 2001. **46**: 149–156), and an environmentally friendly rapid technique for oil-contaminated soil bioremediation (RF Patent 2193464); and a novel methodological approach relevant to utilization of ineffective drugs (World J. Microbiol. Biotechnol. 2012. **28**: 2997–3006). Furthermore, for the first time the application of actinobacteria was shown to be useful in biocorrecting of the basic composition of ceramic material to improve its technical characteristics (Nanotechnologies in Russia. 2008. **3**: 627–632). Our developments in bioremediation were awarded by the Russian Federation Government in the field of science and technology.

IEGM collection initiated and organized international conferences on microbial diversity ICOMID (1995, 2005, and 2008) (**Fig. 8**). Thus, IEGM collection in its scope, diversity of species, range of research and applications of collection strains, and functions performed is qualified in Russian collections that meet the requirements of a Biological Resource Center (OECD Best Practices Guidelines for a Biological Resource Centres, 2007) and to be given the status of the National Center with a target long-term financing.



Fig. 8. ICOMID participants representing a wide range of international expertise and competence in the field of collection activities and research in microbial diversity

At present, Russia has adopted the State Coordination Programme for the Development of Biotechnology for the period up to 2020 – BIO2020 which initiated a wide discussion of the strategy for the development of national biological collections and their adaptation to the new socio-economic conditions at the global level. The scientific and civil communities are currently aware of the need to organize a broad network of national biological resource centres as inexhaustible biotechnology “*Eldorado*” and their global role in the onrush of biotechnology and bioindustry.

The work was supported by the grant of the Federal Targeted Programme “Research and Development in Priority Fields of S&T Complex of Russia for 2007–2013”, Activity 1.8 “Research undertaken with the use of unique facilities and scientific infrastructure (including observation stations, botanic gardens, scientific museums, etc), research institutions and higher educational institutions” (State Contract No. 16.518.7069), and the “FP7 Cooperation Work Programme: Food, Agriculture and Fisheries, and Biotechnologies” (Proposal No. 266106 “BRIO”).

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Conformity Assessment for Biological Resource Centres (BRC): The Brazilian Approach

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Abstract

The Brazilian effort to improve the quality management in service collections is a step forward in the consolidation of the Brazilian BRC Network (CRB-Br). The advances are a consequence of several initiatives involving Brazilian institutions such as the MCTI, Inmetro, Tecpar, Fiocruz, Embrapa, Unicamp, BCRJ, CRIA, INPI and SBM toward the definition of a mechanism for third party assessment and procedures for accreditation structured to put in the foreground the demonstration of a BRC technical competence in developing its activities. The plan to consolidate the CRB-Br takes into consideration all the relevant aspects of metrology, standardization and conformity assessment, according to the National Council of Metrology, Standardization and Industrial Quality recommendations.

Introduction

With the task of developing a conformity assessment system that could be used for the recognition of culture collections as a BRC – according to the definition of the Organization for Economic Cooperation and Development (OECD) – Brazil has concentrated its efforts to meet the significant demand presented by international actions and especially by the Brazilian Biotechnology Development Policy established through the Decree 6041 in February, 2007.

The motivation was exacerbated in the face of the striking evidence of the increase in the regulatory framework on this field as a consequence of intensive efforts within the OECD, the Global Network of Biological Resource Centres Demonstration Project (GBRCN) and the World Federation for Culture Collections (WFCC) to establish a new organizational model and guidelines for

the operation of culture collections combined with more rigid controls on biological materials exchange.

In 2001, with the first approaches by the Brazilian Ministry of Science, Technology and Innovation (MCTI) for structuring a biological material conformity assessment system, it was soon realized that the issue has complex aspects. Besides taking into account the quality management capacity of culture collections they should also be considered for their technical competence. It is important to note that the expertise and technical rigor must be evidenced by the collections in their main processes like storage, maintenance and distribution of biological resources, as well as in the methods and measurement procedures associated with handling and production activities. In addition, activities for verifying, and in some cases to ensure, that a particular biological resource has specified characteristics for research purposes or for production and consumption should follow internationally accepted standards and guidelines. Also, it was a fact that the description of the biological resources characteristics used to rely on the authority of the researchers themselves, which historically had not represented a problem for the scientific community, but still would not be sufficient for other purposes such as conformity assessment and technology development.

Structure of the Conformity Assessment System

All those aspects cited above then needed to be organized in a homogeneous and technically consistent system, capable of providing the necessary confidence to assess the technical aspects that the BRC activities require. Also, the players were interested in having a tool in order to support, in terms of technological services, the fields of biological resource associated information management, biosecurity, biosafety and intellectual property rights. Moreover, it would be necessary to ensure maximum visibility and transparency of these activities to the Brazilian society.

Additionally, in the development of such a system in Brazil two contexts should be highly considered. First, the international context with the developments of the Convention on Biological Diversity (CBD) and, consequently, the advance of the works within multilateral forums and its effects on public policies in different countries. Second, the national context where ongoing initiatives promoted by the Brazilian Federal Government were already aiming by establishing the BRC in Brazil.

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Despite the tendency in the use of the quality management system certification process as a way to assess BRCs, it was decided to structure a differentiated model in Brazil, putting in the foreground the technical competence of a BRC in developing their activities seriously considering all aspects related to metrology, standardization and conformity assessment. It is important to point out that the BRC and the biological resources held by them as well as their participation in the productive chain – from cultivation to final disposal, both for research and development as for industrial and consumption purposes – are subordinated to provisions of regulatory nature emanated from several Brazilian public authorities (Figure 1). So, beyond the basic competence, the system should respond to other aspects, such as biosecurity and other topics.

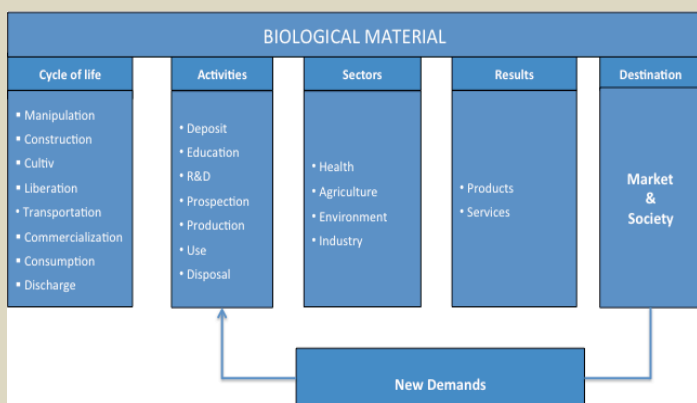


Figure 1: Biological material productive chain.

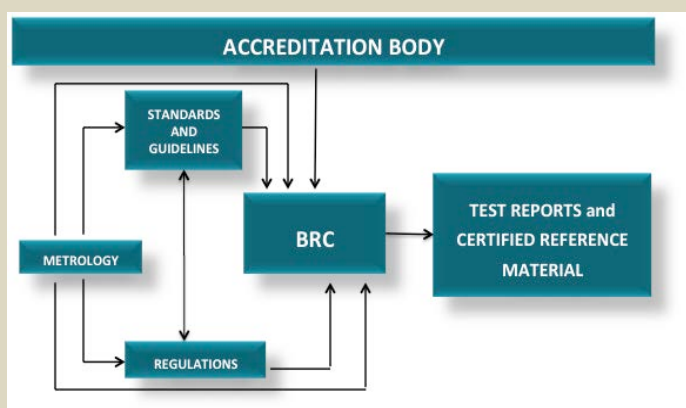


Figure 2: Brazilian model of conformity assessment for BRC.

In the face of that, the Brazilian model of conformity assessment for BRC (Figure 2) is based on the assessment and accreditation of the testing activities and the production of reference materials performed by a BRC, within a specific scope using as criteria the standards ISO/IEC 17025 and ISO Guide 34, both

complemented by the applicable requirements of OECD Best Practice Guidelines for BRC (OECD BPG). The General Coordination for Accreditation (Cgcre) of the National Institute of Metrology, Quality and Technology (Inmetro), which is the official accreditation body in the country recognized by the Brazilian Federal Government and by internationally recognized peer agreements, performs the accreditation processes. By this means, the regulatory authority recognizes the accreditation of the BRC's activities and names it to compose the BBRCN.

The Accreditation Programmes

Faced with the challenges of developing and making the system operational, a technical commission was then created in the auspices of Cgcre to study models for BRC accreditation hereinafter called the CT-CRB. This commission was constituted of representatives of MCTI (Ministry of Science, Technology and Innovation), Inmetro (National Council of Metrology, Standardization and Industrial Quality), TECPAR (Technology Institute of Paraná), Fiocruz (Oswaldo Cruz Foundation), Embrapa (Brazilian Agricultural Research Corporation), Unicamp (University of Campinas), BCRJ (Rio de Janeiro Cell Bank), CRIA (Reference Center on Environmental Information), SBM (Brazilian Society of Microbiology) and INPI (National Institute of Industrial Property).

Initially, the efforts of the CT-CRB was focused on the translation of the OECD BPG and the mapping of culture collections activities that could be accredited as objects of conformity assessment taking into account other programmes already performed by the national accreditation body. Then, the commission elaborated and approved the very first edition of the document that brings the accreditation programme requirements for BRC (NIT-DICLA-61). Through these studies, it became clear the applicability of ISO/IEC 17025, ISO Guide 34 and the OECD BPG in the accreditation of BRC activities.

As the result of the CT-CRB activities was proposed to Cgcre to make available two possibilities of accreditation for those organizations interested in the program:

1. Accreditation of BRC testing activities using the ISO/IEC 17025 as criteria or
2. Accreditation of BRC as a reference material producer using the ISO Guide 34 in combination with the ISO/IEC 17025 as criteria.

In both cases it is mandatory to comply with the OECD BPG requirements applicable to the scope of accreditation as additional requirements.



Cgcre has accepted the CT-CRB proposal. At the moment Cgcre is completing the final phase of development for implementation by publishing the NIT-DICLA-61, training the staff and the assessors and selecting experts. Right after the NIT-DICLA-61 publication the accreditation programmes will be available for those BRC who want to apply for the accreditation.

All the work that resulted in the accreditation programmes was presented by Cgcre at the 13th International Symposium on Biological and Environmental Reference Material (BERM13) held on 25-29 June/2012 in Austria. The receptivity was significant and positive. Different institutions, including accreditation bodies and institutes of metrology from all over the world, showed significant interest and have been looking for more information.

Conclusion

The conformity assessment system for biological resource centres adopted in Brazil, is a third party process and follows the directives of the Brazilian Conformity Assessment System approved by Conmetro. It is structured to contain a set of technical procedures, which results in the issuance of documents to evidence the compliance of a biological resource with specified requirements and is thus aligned with the expectations presented by the Brazilian Decree 6041 and by OECD.

The development of these proposed system requirements allows the availability of more standardized biological resources and associated information with proven quality, which represent gains not only related to the provision of services but also to achieve new levels of technological capability. Thus, it is possible for a culture collection to evidence its compliance with the requirements in order to be recognized as a BRC by a third party and join all sorts of networks that bring together this kind of structure.

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ANNOUNCEMENTS AND LINKS

EBRCN INFORMATION RESOURCE

International Regulations for Packaging and Shipping Microorganisms

http://www.wfcc.info/doc/1357878428/EBRCN_information_resource_on_transport_update_Jan_2013.pdf

WFCC SKERMAN AWARD FOR MICROBIAL TAXONOMY

The World Federation for Culture Collections invites applications from young microbial taxonomists for the WFCC Skerman Award for Taxonomy. The Award was established to honour the contribution made by Professor V. B. D. Skerman to bacterial taxonomy, to the establishment of the WFCC World Data Centre for Microorganisms (WDCM), and to the development of the WFCC.

The aim of the Award is to encourage taxonomic research by young microbiologists and to reward excellence in taxonomic research and significant contributions to the discipline. The successful recipient of the Award will receive a prize of \$2000 together with a return economy class airfare and registration costs to attend the Thirteenth International Congress for Culture Collections (ICCC 13) to be held in Beijing, P.R. China



from 23 to 27 September 2013. The recipient will be invited to deliver the Skerman Award Lecture on his/her research. The recipient will also receive a certificate of the Award. Applicants should be less than 40 years of age at the time of application. Applicants should provide a Curriculum Vita, a list of research publications, the names and addresses of two referees familiar with their research who have agreed to act as referees, and copies of their three most significant research publications. For questions related to the application please contact Ms Anne Depauw, at depa@belspo.be, Belgian Coordinated Collections of Microorganisms, BELSPO, avenue Louise 231, 1050 Brussels, Belgium.

Applications should be submitted to the WFCC President, Philippe Desmeth,

- preferably by Email at desp@belspo.be,
- or by mail at Philippe Desmeth c/o Belgian Coordinated Collections of Microorganisms, BELSPO, avenue Louise 231, 1050 Brussels, Belgium.

The deadline for applications is **1st April 2013**.

Opportunities

1] Michigan State University

To assist in the development of a descriptive ontology of bacterial and archaeal phenotypes (physical characteristics of microorganisms). The ontology is being derived from a normalized declarative vocabulary, extracted from the original descriptions of species and higher taxa that have been published since 1950. The project is part of a larger effort to deliver semantic annotation services to scientific, technical, medical and legal publishers and database providers using novel approaches developed at Michigan State University and commercialized by a university spin-off (NamesforLife, LLC). Funding is through a Phase II STTR Award to the company from the Department of Energy.

Contact Information

Applicants should upload a cover letter, résumé and contact information for three references online at (<https://jobs.msu.edu>). Further inquiries should be directed to Dr. George M. Garrity, project PI, by e-mail (garrity@msu.edu) or by telephone (+1 517 432 2459).

2] Bell Museum of Natural History College of Food, Agricultural and Natural Resource Sciences (CFANS)

Position: Mycologist and Curator of Fungi, Bell Museum/Plant Pathology
Classification: Assistant Professor, 9 month appointment

Reporting To: Director, Bell Museum and Head, Plant Pathology
Position Number: 256974

CONFERENCES AND WORKSHOPS

1] BRCs in the Era of Microbial Genomics and Diversity Driven Innovation of Biotechnology

ICCC-13

September 23-27, 2013

BEIJING, CHINA

<http://iccc13.wfcc.info/dct/page/1>

2] United States Culture Collection Network

<http://www.usccn.org/activities/Pages/2012APSCollectionSession.aspx>



3] The US NSF Research Coordination Network grant for “A community of ex situ microbial germplasm repositories”

held its first meeting at the Fungal Genetics Stock Center in Kansas City Missouri on September 5 – 8.

The event began with a series of lectures on career opportunities in collections which attracted over 60



secondary students from over 6 local schools. Thursday began with visits to the FGSC where culture collection curators learned techniques used for preservation of filamentous fungi. Thursday afternoon included participants from many agencies and scientific societies (see attachment) and ended with a Kansas City Barbeque and a series of culture collection success stories. Friday was devoted to developing plans for teaching workshops on culture collection practices and capacity building.

The network has launched their website as the homepage of the US Culture Collection Network (www.usccn.org) which is hosted by Scientific Societies (www.scisoc.org)

The next meeting of the USCCN will be held at the Bigelow Labs National Center for Marine Algae and Microbiota in fall 2013.

4] International Scientific Conference on Bacteriophages: Theoretical and Practical Aspects of Their Application in Medicine, Veterinary and Food

**Ulyanovsk, Russia,
April 23-25, 2013**

<http://www.congress-bacteriophage.niicmib.ru>

5] 12th International Symposium on the Genetics of Industrial Microorganisms

**23-28 June, 2013
Cancun, Mexico**

<http://www.smbb.com.mx/GIM2013-Cancun/>

6] 17th International Symposium on the Biology of Actinomycetes (ISBA'17)

8-12 October 2014, Kusadasi, Turkey

BOOKS AND REVIEWS

A phage bibliography
of 31,000 references

Introducing the *Felix d'Herelle Reference Center for Bacterial Viruses*

It is a sequel to the bibliographies of H. Raettig (1917–1965),¹ which include over 11,000 references.² The complete body of the phage literature is estimated at 45,000 publications. The present bibliography is based on the documentation of H.-W. Ackermann and S.T. Abedon³ and the Scopus and Current Contents databases. It starts in 1965, can be consulted free of charge and will be periodically updated. In addition, it includes historical references and selected articles from the years prior to 1965. The bibliography comprises papers from periodicals, book chapters, books and doctoral theses. It excludes meeting abstracts, personal communications and patent applications.

The bibliography is searchable by keywords and accessible at the Felix d'Herelle Reference Center for Bacterial Viruses, located at the Faculty of Science of Laval University (www.phage.ulaval.ca).

Hans-W. Ackermann, MD, Professor

¹ Raettig H. *Bakteriophagen* 1917 bis 1964. Vol. II. Author: Gustav Fischer 1968

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