



WORLD FEDERATION FOR CULTURE COLLECTIONS Newsletter (No. 51)–DECEMBER 2011

NEWS FROM THE WDCM

The Second Symposium of World Data Centre for Microorganisms (WDCM)

June 6-8, 2012

Beijing, China

Fostering Information Environment for the Preservation and Exploration of Microbes

Microbes play a key role in the material cycles of Earth. Many industries-biomedical, agricultural, food, environmental and most recently, energy-have been created based on the different functions of microbes. As a result of this long history of research and industrialization, many microbes have been isolated, characterized and preserved (when possible) in culture collections, although the vast majority of them have yet to be discovered. Currently, with rapid development of high-throughput sequencing technologies, microbiology has also become a data science. BRCs also have to function as data and information repositories to serve academia, industry and the public. As a result, the World Data Centre of Microorganisms (WDCM) takes the responsibility to develop an effective information environment that promotes and sustains microbial research data activities, sharing and use to help advance progress and bridge the gaps within and outside the microbiology communities.

In 2012, we will convene the Second World Data Centre of Microorganisms (WDCM) Symposium. The conference will bring together scholars and experts from the World leading culture collections and academic institutes to discuss the scientific/technological/social issues and their solutions. We hope, by virtue of WDCM platform, a practical international cooperative initiative can be laid down so as to accelerate the information integration and data sharing of microbial resources.

Topics:

1. Information tools to implement the Nagoya Protocol on microbial resource access and sharing
2. Development and implementation of standards for microbial resources information.
3. Progress of WFCC Global Catalogue of Microorganisms
4. Next generation software package for microbial resources information
5. Explosion and impact of genomic data of microbes to microbial resources centres
6. Utilization of microbial resources information in academia, education and industry

Hosted by:

**World Federation for Culture Collections
(WFCC)**

**Institute of Microbiology, Chinese Academy of
Sciences (IMCAS)**

**The Committee on Data for Science and
Technology (CODATA)**

**Research Network for Applied Microbiology,
Chinese Academy of Sciences (RNAM)**

Organized by:

**WFCC-MIRCEN World Data Center for
Microorganisms (WDCM)**



Update of CCINFO Database

Up to February 8, 2012, 601 culture collections of 68 countries have registered in CCINFO, among which 251 collections have produced the catalogue of holdings. There is 4890 staff in total working in these 601 culture collections and the number of microbial strains has reached 1809534. Among them, 782813 are bacteria, with 528038 fungi, 32678 viruses, and 8703 cell lines.

CCINFO database has been hosted by Institute of Microbiology, Chinese Academy of Science since July 2011. The new web version is available at www.wfcc.info/ccinfo. The registered culture collections can update their information and strain lists according to the reference catalogue in XML or Excel format we offer on this new member management web page.

Country	No. of collections
Africa	11
America	137
Asia	204
Oceania	42
Europe	207

Table 1: Statistics of registered culture collections

Supported by	No. of collections
Governmental	238
University	224
Semi-governmental	57
Private	35
Industry	17

Table 2: Statistics of the collections' financial support

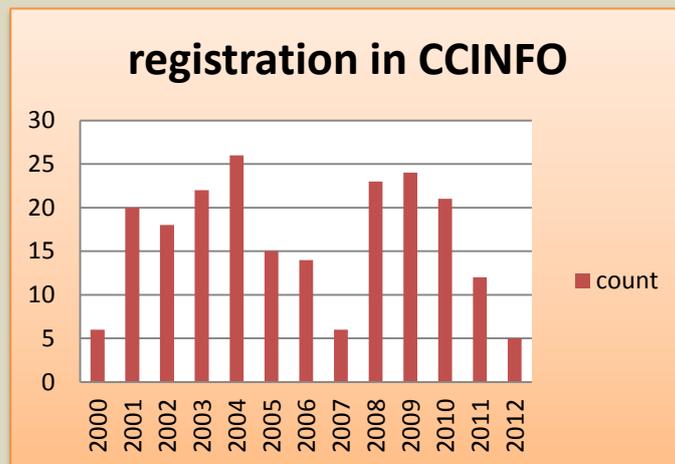


Fig.1: Statistics of registration of culture collections since 2000

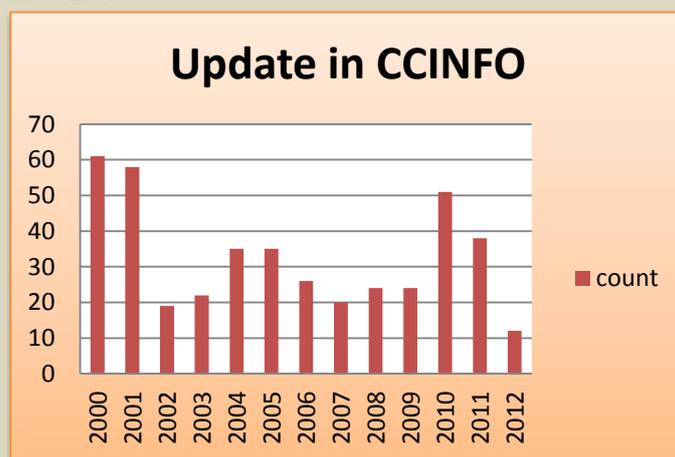


Fig.2: Statistics of update frequency of culture collections since 2000

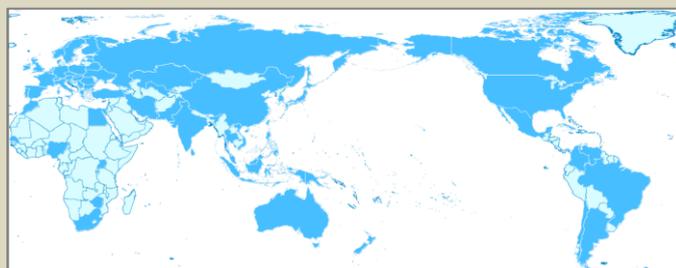


Fig 3: The worldwide distribution of culture collections (The countries in dark blue are those who have culture collections already registered in CCINFO)



A culture collections' voice at the United Nations

*C. Rohde, D. Fritze, D. Martin, D. Smith &
J. Stalpers*

The Seventh Review Conference of the Biological and Toxin Weapons Convention, BTWC, took place at the UN, Geneva, 05-22 December 2011, under the leading motto of *J. W. von Goethe's* words.

“Knowing is not enough,

We must apply.

Willing is not enough,

We must do”

J. W. von Goethe

This 7th RevCon was – as some delegates pointed out - the first one with quite an open atmosphere enabling the UN States Delegations to articulate their expectations concerning the sustainable success for the BTWC and for better verification mechanisms. Currently, 171 States are signatories to the Convention, 16 countries are yet to ratify and 23 states are non-signatories (see <http://www.opbw.org/>). Each year, there is an expert conference and a Delegates conference on the BTWC, as a result the BTWC is constantly monitored. The main BTWC focuses are potential bio-weapons state programmes and potential terrorist attacks by non-state actors. The 6th RevCon was in 2006. Previous RevCons did not reach the anticipated level of expectation; the effectiveness of the BTWC remains incomparable to the Chemical Weapons Convention. The 7th RevCon was the first one giving selected NGOs the chance to make statements, also, for the first time the President (currently, Paul van den Jissel) invited the NGOs to a special closed session to hear their impressions on the 7th RevCon. He stressed that NGOs need more room in the future as, too important are their missions and too valuable what they postulate.

It was a great honour for the BRC community to be selected as one of eighteen NGO speakers to give an official statement; through the umbrella of GBRCN, the Global Biological Resource Centre Network, the Biosecurity Code of Conduct (CoC), elaborated by an EMbaRC/GBRCN working group and agreed by EMbaRC and GBRCN members at the Utrecht Workshop in September 2011, was presented at the 7th RevCon as a model Biosecurity CoC with high outreach potential and a long-lasting impetus. Repeatedly, State Delegates mentioned the key role of Codes of Conduct, along with awareness raising and confidence building measures; the CoC for BRCs as presented was well received by the RevCon.

The weakness of the BTWC is that verification mechanisms are missing (e.g., no lists); the BTWC is an international convention without true power. We went to the UN to help strengthen the BTWC, to encourage State Delegates to take back home the CoC as a model and to start top-down processes in their countries to implement verification, involving their respective authorities and national legal enforcement mechanisms. Kathryn Nixdorff, a renowned BTWC expert, stressed that Codes of Conduct have outstanding importance in the bio-scientific world; they are the only way to strengthen the BTWC, keeping the dual-use dilemma in mind.

The Biosecurity CoC that we presented to the international States community was seemingly accepted with positive astonishment with the comment “how brief it seems”.

The 7th RevCon was finished on 22nd December and we expect detailed reports in due course of time through the unog website (www.unog.ch).

The UN is a most honorable forum for the Biosecurity CoC from which to get deserved acknowledgement, an important (and unexpected!) milestone. It is now most important that the culture collections adopt the CoC. Together with the Code itself, a background document on the development of the CoC has been written. Furthermore, a procedural practical document is under



development that will be a compilation of “step-by-step” guidance on how to implement the CoC in the daily life of collections – though no others know it better than culture collections. The key issues will be biorisk management, raising awareness, reporting misuse, internal and external communication, research and sharing knowledge, accessibility, supply, shipment and transport.

Moving on from the inaugural EMbaRC/GBRCN working group meeting to develop a Biosecurity CoC in October 2010, Braunschweig; a workshop in September 2011, Utrecht; the presentation via NGO Statement in December 2011, Geneva, we should use the WFCC as the main forum to discuss further steps on how to implement the CoC. What is the next milestone? We anticipate a process being initiated by UN State Delegations but they expect that all culture collections implement the CoC. The Biosecurity Code of Conduct for BRCs and the accompanying document can be found via <http://www.embarc.eu/biosecurity.html>.

NEWS FROM MEMBERS

The EMbaRC Project and culture collection success stories

David Smith CABI, Egham, UK

A recent article by Smith (2011) addresses the activities that are on-going to attempt to co-ordinate the strategies, policies and mechanisms for the collection and distribution of organisms to help underpin and drive today’s microbial innovation and research. This should sound familiar to all who are partner to the World Federation for Culture Collections as this has been a part of our remit since its origins. Why are we looking to other networks and initiatives to do this? The WFCC has done a fantastic job to bring the culture collection community together and to facilitate the sharing of knowledge and to provide a common voice on many issues. However, it is evident that to take this forward the WFCC needs to work with others to secure the resources and mechanisms to deliver the necessary change. Culture collections will need considerable help to become modern microbial domain Biological Resource Centres (mBRCs). mBRCs need to be equipped with expertise and have access to technologies that will help them cope with the depth and breadth of emerging biodiversity. Many collections need investment to enable them to provide local scientists with ready access to high quality biological material and scientific services while observing the rights of donor countries, intellectual property rights, and biosafety and biosecurity requirements. A major challenge is to keep abreast of developments in taxonomy and systematics, while maintaining expertise as new methods to authenticate, identify, cultivate, and maintain cultures are developed. To meet the challenges, individual mBRCs will need to collaborate, harnessing the power of networking on national, regional, and global levels.

Over the years WFCC affiliate member collections have collaborated in small project consortia in answer to research programme calls to gradually, piece by piece, develop tools and strategies to enhance collection operations and delivery. However, the large investments necessary to develop collections and coordinate output has been

DSMZ The Biosecurity Code of Conduct for Biological Resource Centres
A Signal to Strengthen the Global Implementation of the BTWC

GBRCN
GLOBAL BIOLOGICAL RESOURCE CENTRE NETWORK
DEMONSTRATION PROJECT

Christine Rohde^{1,4}, Dagmar Fritze¹, Dunja Martin¹, David Smith², Joost Stalpers¹, Jörg Overmann¹
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The complexity of legitimate collection, distribution and use of biological material demands coordination and sharing of activities. Biological Resource Centres (BRCs) bear huge responsibilities: being charged with holding and distributing bio-resources world-wide, they must ensure that all relevant legislation, including that relating to biorisk, are strictly followed. Containment, health & safety, correct transport, traceability, import, export and dual-use matters are key issues. BRCs must provide access to high-quality material, related data and scientific services while, at the same time, observe biosafety and biosecurity. Global cooperation is the only way forward to keep pace with modern scientific and legal developments and to follow-up e.g. with the demand for biorisk management.

In full recognition of these challenges, a BRC Task Force of the OECD developed the concept of a Global Biological Resource Centre Network (GBRCN), for which a Demonstration Project has been funded by the German Federal Ministry of Education and Research (BMBF).

To specifically address biosecurity, the GBRCN (www.gbrcn.org) felt the need to develop a Code of Conduct on Biosecurity designed for Biological Resource Centres (BRCs). This was elaborated in close cooperation with the regional EU-funded project EMbaRC (www.embarc.eu). Building on existing legislation and guidelines and existing Codes of Ethics, the present Code lays particular emphasis on the biological resources themselves, their physical / operative control, access to them, work with them and their controlled supply to authorised third parties.

► **This CoC addresses in particular** • Biorisk management • Raising awareness • Reporting misuse • Internal & external communication • Research & sharing knowledge • Accessibility • Supply, shipment & transport

► **The aim of this CoC** is to prevent microbial BRCs from directly or indirectly contributing to the malicious misuse of biological agents and toxins, including the development or production of biological weapons. This Code calls for implementation and compliance of awareness, accountability and oversight and targets in addition all those engaged in life sciences activities, laboratory workers, managers, stakeholders and others beyond the BRCs.

► **This CoC acknowledges** that improved knowledge is intrinsically associated with the potential for dual application: for beneficial or malicious purpose. The possibility of using scientific knowledge for peaceful or non-peaceful purposes reflects the *dual-use dilemma*. The responsibilities of those engaged in the life sciences have an increasing role for in-depth implementation of the BTWC. Scientific openness and a sense of security are prerequisites for freedom of scientific work. This Code of Conduct on Biosecurity is to help BRCs promote a basic ethical understanding of science compliant with the BTWC and raise awareness to prevent misuse in the life-sciences context. It intends to raise awareness on biosecurity within and outside BRCs and to clearly demonstrate that BRCs are fully compliant with national and international legislation and support the BTWC as an international norm prohibiting biological weapons.

The GBRCN suggests that this CoC be implemented by BRCs all over the world. This Code is designed in such a manner that similar scientific and biomedical institutions and, on a higher level, scientific associations and societies can adopt this CoC to demonstrate their will to strengthen the BTWC.

GBRCN Demonstration Project Partners: Brazil, CRIA; Belgium, BCCM; Canada, AgCanada; China, CAS; CAAS; Finland, VTT; France, CRBIF; Germany, DSMZ; Italy, ICL; Japan, NITE; WDCM; Kenya, JKUAT; Netherlands, CBS; Portugal, MUM; Spain, CECT; Taiwan, FIRDI; Uganda, Univ. Makerere; Great Britain, CABI



elusive. For these very reasons, the GBR CN – Global Biological Resource Centre Network, ECCO – European Culture Collections’ Organisation and EMbaRC - European Consortium of Microbial Resources Centres consortia submitted a proposal to the European Strategy Forum for Research Infrastructures (ESFRI).



Resources Success Stories (2012). This provides a number of articles on how culture collections have contributed to products and solutions to bioindustry problems. It provides an excellent case why Governments and funders should invest. You can access and download copy from the EMbaRC web site (www.embarc.eu).

The WFCC participates, either directly as a partner, through its officers on the Executive Board, and its affiliate collections in the various funded initiatives. As seen above and in its Newsletters, such as this one, the WFCC continues to work with others on behalf of its members and the microbiological community in general to improve delivery of reference and production strains for, science, education and bioindustry.

Acknowledgements to project funders: European Consortium of Microbial Resources Centres (EMbaRC) project (EU Seventh Framework Programme Research Infrastructures (INFRA-2008-1.1.2.9: Biological Resources Centres (BRCs) for microorganisms (Grant agreement number: FP7- 228310) and for the GBR CN, the Bundesministerium für Bildung und Forschung (BMBF), the German Federal Ministry of Research and Education.

References

- Smith, D. (2011). Biological Resource Research Infrastructures to drive innovation in microbiology. *Microbe* Vol: 6; No. 11 (November) p482. On line: <http://www.microbemagazine.org/index.php/11-2011-home/4035-research-resources-help-to-drive-innovation-in-microbiology>
- Smith, D. & Day, P. (2012). European Consortium of Microbial Resource centres: Microbial Resources Success Stories. EMbaRC, CABI, UK,

The Microbial Resources Research Infrastructure (MIRRI) is one of three new Research infrastructures (RI) added to the 2010 ESFRI road map. MIRRI plans to establish clusters of expertise to address problems faced by BRCs and to meet the specific requirements of individual users. To succeed and to become sustainable, modernized culture collections and the mBRCs will need to work more closely with policy makers, funders, and researchers to deliver resources and services needed for innovation.

The EMbaRC project consortium has worked tremendously hard over the last three years to develop operational practices in order to improve the functioning and coordination of collections (see www.embarc.eu). The Biosecurity code of conduct is an excellent example of community best practice designed to address political and procedural issues of global concern. It has been evident over the years of trying to get investment into culture collections that we need to provide funders with evidence of the good collections do. As a step towards providing such evidence the EMbaRC project has published a short brochure *Microbial*

Japan Society for Culture Collections (JSCC) 60th Anniversary Symposia at IUMS2011 Sapporo

Takashi Itoh and Ken-ichiro Suzuki

Japan Society for Culture Collections (JSCC) celebrated its 60th anniversary with three memorial symposia at the IUMS2011 Sapporo on September 7, 2011.



The JSCC is one of the oldest and most active regional culture collection networks in the world. It had been originated as the Japanese Federation of Culture Collections (JFCC) in 1951 on the occasion of the census of microbial resources preserved in universities and national institutes, and has re-organized as a scientific society since 1993. The aim of the JSCC is to promote studies on microbiological resources; including taxonomy, preservation techniques, and other related microbiology as well as studies on socio-scientific matters for handling and transferring microbial materials under various kinds of laws and regulations. In order to achieve such purposes, the JSCC has been continuing following activities: 1) publication of the official journal “Microbiology and Culture Collections” and related publications such as the strain catalogues; 2) organization of annual meetings and symposia related to taxonomy and identification, preservation of microbial cultures, and management of culture collections; 3) construction and dissemination of databases on microbial strains maintained in the Japanese culture collections; 4) effective liaison and cooperation with related intra- and international societies; 5) cooperation with intra- and international culture collections and allied institutes/organizations; 6) conferment of awards for remarkable achievements in the culture collection business and related research fields. The society currently consists of 23 affiliated culture collections and approximately 201 individual members, and 20 sustaining organizations. A detailed history of JSCC up to 2001 can be referred in an article by DC K. Komagata in WFCC newsletter No. 33 (August, 2001). Also the JSCC has a website with the following address: <http://www.jsc-home.jp/>.

In the year of the JSCC's 60th anniversary, the IUMS congress was coincidentally held in Sapporo, Japan. Then, the JSCC and IUMS organized three memorial symposia at the congress entitled “Phenotypic Diversity for Microbial Systematics”, “Genomics and Resources in Microbiology” and “Culture Collections and Microbial Systematics”. The last one was co-organized by JSCC and WFCC as a joint symposium to attract culture collection staffs and scientists who were interested in microbial taxonomy, phylogeny, genomics and microbial resource businesses. Despite the initial

concerns about safety and the status of Japan after the Great East Japan Earthquake and the Fukushima nuclear disaster, the IUMS2011 Sapporo finished with success by attendance of more than 4,800 participants from 65 regions/countries. Actually, each of the three symposia gathered a large audience as well. The first session impressed the importance of phenotypic characterization in classification and identification of microorganisms. The second session was focused on the fungal genetic and genomic studies and activities of two model consortia that support the genomic researches from the aspects of genomic description and microbial resources. The last session covered species-level classification related to the species description and nomenclature, and will be contributing to the informatics and quality management of microbial resource centres/culture collections and their networks from the viewpoint of microbial systematics.

In addition to these three symposia, the annual meeting of JSCC was held on the next day during the IUMS2011 Congress. The meeting began with General Assembly and Special Reports from the president, Dr. K.-I. Suzuki, followed by JSCC Award Lecture by Dr. J. Yoon, Keimyung University, Korea, who won the JSCC Award for Young Scientist of this year, and JSCC Workshop for Practice of Culture Collections entitled “Database, Tools and Networks to Promote Microbial Culture Collections and Systematics”. The special reports briefed the 60 years history and current activity of JSCC, and the risk management of culture collections including the results of the questionnaire from the member collections in the aftermath of the Great East Japan Earthquake and the following powerful tsunami and the Fukushima nuclear accidents. According to the result of questionnaire, serious losses of microbial resources and damages of the facilities were not reported, however, there were a number of lessons how culture collections protect the resources from such devastating disasters. At the JSCC workshop, six talks were presented that increase the usefulness of microbial resource centres/culture collections for their users and microbial taxonomists. The detailed programs of the three symposia can be seen at the website of IUMS2011,



(<http://www.congre.co.jp/iums2011sapporo/index.html>). The proceedings of the JSCC's 60th anniversary symposia will be published soon.

The next IUMS Congress will be held at Montreal, Canada in 2014. WFCC will be expected to contribute to the congress as the federation of IUMS.

<http://www.iums.org/>



Fiocruz microbial collections: the impact of biodiversity to public health

*Manuela da Silva, Elisa Cupolillo & Claude Pirmez
(Fundação Oswaldo Cruz, Brazil)*

The Brazilian biodiversity reserves are among the greatest in the world. Part of this biodiversity is expressed by a variety of infectious microorganisms, some of them responsible for severe diseases. Concurrently, this same biodiversity, rather than being a health problem, may also represent a solution either as biological control of human disease-causing species or through the production of bioactive compounds that can be used for therapy. Within this context, Fundação Oswaldo Cruz (Fiocruz), a Brazilian federal organization that coordinates a well-structured network of epidemiological control and public health, hosts different culture collections holding strains that range from archaea, bacteria, and fungi to protozoa, representing part of the

Brazilian microbial diversity and expressing a variety of infectious agents related to different tropical diseases. Coupled to the biological material, there is the information associated, including epidemiological data, which can be of great value in helping decision and policy makers.

The Fiocruz microbial collections are dedicated to preservation, storage, distribution, taxonomic characterization, and identification of microorganisms and associated information. The services provided by these collections meet the needs of public research and educational institutions, industry in general, offering assistance and technical and scientific consultancy, training and development of specific research projects.

For the last 6 years Fiocruz has been providing institutional recognition and support to these microbial collections. In order to start this process, a permanent work group (WG), constituted by representatives of these collections was established. The first task of this WG was to build an institutional guide that settled the policies and strategies for the development of biological collections. In this context, the first line of action was to evaluate the current situation of these collections. Four main criteria for the institutional recognition of the biological collections were then defined: I) to conduct activities such as preservation, deposits, distribution, taxonomic identification of microorganisms, besides scientific consultancy and training; II) to have a curator; III) to conduct registration of procedures and maintenance of documentation; and IV) to possess minimal human resource and infrastructure.

The evaluation demonstrated the need to harmonize procedures and protocols. Therefore, the flow for institutional recognition of the collections, including the evaluation procedure, and the responsibilities of the curator and substitute were defined and formalized and the policy for the access of data and information on the Biological Collections was established.

More recently, Fiocruz joined the Brazilian Biological Resource Centre Network, which is a



result of the growing demand (from industry and academia) for certified material, specialized services and information as well as the emerging legal, technical and sanitary barriers associated with the access of biological material and genetic resources to the global market. In this context, quality management has been approached and implemented within the Fiocruz microbial collections, based on ISO/IEC 17025/05 and OECD Best Practice Guidelines for Biological Resource Centres, in partnership with the National Institute of Metrology, Standardization and Industrial Quality (INMETRO) and Paraná Institute of Technology (TECPAR). In addition, information management software (System for Collections of Biotechnological Interest - SiCol), developed by the Reference Centre on Environmental Information (CRIA), is at the moment integrating data amongst these collections at Fiocruz. Through this system, each culture collection has its own website from where any user has access to the general information on the culture collection, strain catalogue, services offered, staff and contact. The access can be through the links available on Fiocruz website (<http://www.fiocruz.br>) and on WFCC website (<http://www.wfcc.info>).

The main objective of all these efforts is to develop a national project led by Fiocruz to building a Biological Resource Centre for Health (Health-BRC). This Health-BRC will be constituted of microorganisms related mainly to tropical diseases of Latin America, including neglected diseases, in order to support scientific research, epidemiology surveillance, as well as the development and production of bio-compounds directed to diagnosis, vaccines and drugs. The Health-BRC will be supplied by microorganisms, including virus, bacteria, fungi and protozoa, from the culture collections and the public health laboratories at Fiocruz.

The strategy behind this project is to use the Brazilian microbial diversity in a responsible and sustainable way in order to give support to biotechnological innovation in Brazil.

ANNOUNCEMENTS AND LINKS

The Convention on Biological Diversity Calendar of Events (confirmed as of 15 March 2012)

Date	Event	venue	Relevant documents for WFCC	More information
29 April 2012	The thirteenth meeting of the Coordination Mechanism for the Global Taxonomy Initiative	Head-office of the Secretariat of the Convention on Biological Diversity		http://www.cbdiv.int/gti/coordination.shtml
30 April – 5 May 2012	The sixteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA 16)	The headquarters of the International Civil Aviation Organization (ICAO) in Montreal, Canada.	UNEP/CBD/SBSTTA/16/12 Revised Draft Capacity-Building Strategy for the Global Taxonomy Initiative UNEP/CBD/SBSTTA/16/INF37 Implementation of the Nagoya Protocol on access and benefit-sharing and the Global Taxonomy Initiative	http://www.cbdiv.int/sbstta16/documents
30 April -4 May 2012	The Expert Kiosk for invasive alien species and taxonomy	The headquarters of the International Civil Aviation Organization (ICAO) in Montreal, Canada		
7-11 May 2012	Ad Hoc Open-Ended Working Group on Review	The headquarters of the International Civil		



	of Implementation of The Convention	Aviation Organization (ICAO) in Montreal, Canada.		
2 July 2012 - 6 July 2012	Second Meeting of the Open-ended Ad Hoc Intergovernmental Committee for the Nagoya Protocol on ABS (ICNP-2)	New Delhi, India		http://www.cbd.int/doc/?meeting=ICNP-02
1 - 5 October 2012	Sixth meeting of the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol on Biosafety	Hyderabad, India		http://www.cbd.int/doc/?meeting=MOP-06
8 - 19 October 2012	Eleventh meeting of the Conference of the Parties to the Convention on Biological Diversity	Hyderabad, India		http://www.cbd.int/doc/?meeting=CO P-11

US NATIONAL SCIENCE FOUNDATION SUPPORTS CULTURE COLLECTION NETWORK

The proposed Research Coordination Network for "A community of ex situ microbial germplasm collections" has been recommended for support.

Please see

http://www.fgsc.net/RCN2011/CSBR_RCN.htm for news and updates.

THE US DOE JOINT GENOME INSTITUTE HAS SELECTED THE 1000 FUNGAL GENOMES PROGRAM FOR SEQUENCING

Because of the tremendous diversity of this project, culture collections are especially invited to participate. Please contact Kevin McCluskey for information on contributing to this project. (mccluskeyk@umkc.edu)

NAGOYA PROTOCOL ON GENETIC RESOURCES ACHIEVES 92 SIGNATORIES

<http://www.cbd.int/doc/press/2012/pr-2012-02-03-abs-en.pdf>

CONFERENCES AND WORKSHOPS

31st ANNUAL MEETING OF THE EUROPEAN CULTURE COLLECTIONS' ORGANIZATION ECCO XXXI

<http://www.eccosite.org/>

Closing the gap between science and society

14-15 June 2012, Braga, Portugal

SUMMER SCHOOL

MICROBIAL METABOLITES IN NATURE AND MEDICINE

The fourth in the series of John Innes–Rudjer Bošković Summer Schools on Applied Molecular Microbiology, to be held in Dubrovnik, Croatia,

August 25 – September 2, 2012.

Full details, including the availability of grants to attend the summer school, are at

<http://www.jic.ac.uk/science/molmicro/summerschool/index.htm>

BACTERIOPHAGES AND PROBIOTICS ALTERNATIVES TO ANTIBIOTICS

Tbilisi, Georgia, July 1-4, 2012

The Conference organized by the Eliava Institute of Bacteriophage, Microbiology, and Virology (EIBMV, Tbilisi, Georgia) is dedicated to the 120th anniversary of the birth of Professor George Eliava, the founder of the Institute. The Conference will enhance the awareness of applying bacteriophages and probiotics in therapy and prophylaxis of bacterial diseases, and minimizing the use of



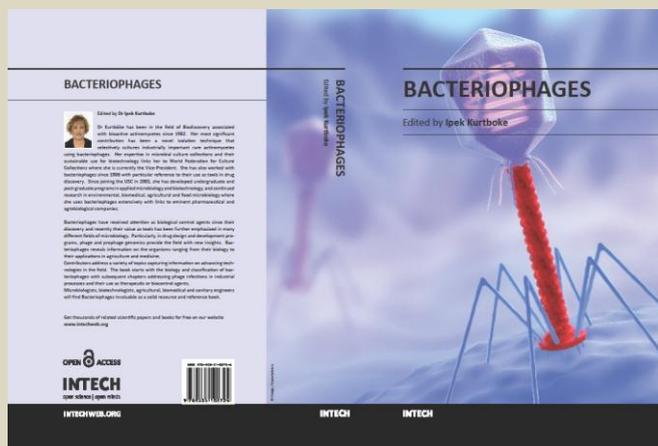
antibiotics when possible. The Organizers strongly believe that professional exchange of scientific knowledge and expertise between the CIS and Western colleagues will lead to new approaches in the fight against emerging or re-emerging, health threatening, multi-drug resistant bacteria, and will contribute to the improvement of human, animal, and plant health.

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BOOKS AND JOURNALS

BACTERIOPHAGES

<http://www.intechopen.com/>



INTERNATIONAL JOURNAL OF MICROBIOLOGY AND MICROBIAL BIOTECHNOLOGY

Has started its publication life and welcoming
submissions regarding cultures collections
<http://www.intechweb.org/ijmmb-journal.html>