

World Federation for Culture Collections: professionals underpinning microbial systematics



Philippe Desmeth

WFCC President
World Federation for Culture Collections
<http://www.wfcc.info>
Belgian Coordinated Collections of Microorganisms
Belgian Science Policy Office
Avenue Louise, 231
1050 Brussels, Belgium
Email philippe.desmeth@belspo.be



Ipek Kurtböke

WFCC Vice-president
World Federation for Culture Collections
<http://www.wfcc.info>
University of the Sunshine Coast
Faculty of Science, Health and Education, Maroochydore DC
QLD 4558
Email ikurtbok@usc.edu.au

The World Federation for Culture Collections (WFCC) is a multidisciplinary commission of the International Union of Biological Sciences (IUBS) and a Federation within the International Union of Microbiological Societies (IUMS). The WFCC is concerned with the collection, authentication, maintenance and distribution of cultures of microorganisms and cultured cells. Its aim is to promote and support the establishment of culture collections and related services, to provide liaison and networking between the collections and their users, to organise workshops and conferences, publications and newsletters and work to ensure the long-term perpetuation of important collections.

Culture collections and World Data Centre for Microorganisms (WDCM)

Culture collections are infrastructures specialised in long-term, *ex situ* conservation of microbial resources, which include huge numbers of specimens of reference. These specimens are referred to as “type strains” when they constitute the archetype of a species, and as “reference strains” when they are a specimen of a lineage with well-identified properties. The “type strains” constitute the primary elements of taxonomy, the “reference strains” are essential parts of a coherent R&D process chain. Therefore, for research consistency and knowledge built up, the systematic deposit in culture collections of studied microbial material should be the rule by default. Combined with appropriate digital storage of metagenomic data, long-term conservation of characterised strains is essential to underpin bioeconomy.

The basic mission of culture collections is to provide facilitated access to fit-for-use (technically and legally) characterised microbiological resources. These facilities are established all around the world and most of them are registered with the WDCM of the WFCC. WDCM was developed as an international database of *ex situ* microbial resources worldwide in the 1960s through the pioneering activities of Professor Skerman and his colleagues at the University of Queensland, Australia.

There are currently more than 580 culture collections in 68 countries registered in the WDCM. The WDCM database forms an important data hub facilitating communication among WFCC members and providing information about the holdings of the collections. It also records data on the organisation, management, services and scientific interests of the collections. The WDCM website is a key communication tool of the culture collections community. Its designers intend it to become a key instrument for microbiologists, a ‘one-stop-shop’ portal where scientists can find microbial resources and related information.

WFCC networking the culture collections

Culture collections cannot work alone in a world of decreasing support for basic science, and the WFCC helps them band together and assist each other in support of the world microbiology community. The WFCC has an Executive Board and works through workgroups. Endangered culture collections, in particular, work towards the survival of collections, which face extinction due to lack of support.

The WFCC newsletter, published twice a year, aims to provide a forum in the areas of microbial systematics and long-term

survival and maintenance of culture collections which might otherwise be unheard of in the distant parts of the world. It provides curators with opportunities to reach their counterparts in the global arena and exchange news and information related to their collections.

Transforming culture collections into biological resource centres and WFCC's role in this transformation

Culture collections undergo a necessary metamorphosis to adapt to operational environment changes, not only following scientific and technical progress but also under the growing pressure of socio-economic, legal and political constraints. They have evolved proactively or reactively from having been mostly providers of microbiological material for the scientific branch to increasingly becoming resource providers for society at large. The shift of terminology reflects this evolution: while in the past, "culture collections – CC" were essentially seen and run as centres of conservation and distribution of microbiological material, "biological resources centres – BRC" are conceived now as the sources of all essentials for research and development in life sciences². To fulfil their role of basic infrastructure for biosciences in a knowledge-based bioeconomy³, they must implement quality management systems in a constant search for improvement of their management and scientific expertise.

BRCs must also overcome legal and administrative hurdles

to give appropriate access to microbiological resources and related information. They must implement in an efficient way, and at affordable cost, diverse international, supra-national and national laws and regulations. In addition, security concerns now require extra attention and appropriate precautions. Those that cannot negotiate the bend disappear, and with them valuable documented microbiological assets. The others still face difficult times and must constantly adapt, and increasingly integrate new paradigms to find adequate solutions to new demands and constraints.

Individual BRCs have limited funds and personnel and the appropriate strategy to meet the challenges is to combine their strength into more or less structured and integrated networks, at national, regional or international level. Such functional networking requires adapted information and communications technology (ICT) to optimise communication, minimum quality standards and technical level to facilitate scientific cooperation, as well as compatible policies regarding intellectual property rights management, and material and information distribution according to the provisions of the Nagoya Protocol under the Convention on Biological Diversity⁴.

An OECD pilot project supports networking within the culture collections community. The Global Biological Resource Centre Network (GBRN) focuses on the improvement of international access to high-quality biological materials and data. WFCC currently participates in this initiative and:



- provides an effective voice in international initiatives and science policy development
- enhances effective electronic communication
- provides support mechanisms to improve the management of preserved biodiversity through common quality and authenticity standards, education and capacity building
- develops mechanisms to improve financial resources to support culture collection programs
- provides tailored training programs to meet the requirements of international initiatives
- consolidates and develops the existing international linkages
- involves national and regional organisations of culture collections to enhance collaboration
- promotes the awareness and use of member expertise.

Conclusion

WFCC will continue to be a bridge in current global transformation by capturing recent advances and incorporating these developments into the worldwide culture collections in an era of post-genomic upsurge.

References

1. The concept of Biological Resource Centres (BRC) was thought up as early as 1946, at UNESCO, on the initiation 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 Biological Resource Centres Underpinning the future of Life Sciences and Biotechnology. OECD Science & Information Technology, May 2001, 7, 1–68 OECD.
2. See recommendations in document: OECD Best Practice Guidelines for Biological resource Centre, 2007, OECD, Paris.
3. 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 analyzed 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

- 4 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. See <http://treaties.un.org/doc/Treaties/2010/11/20101127%2002-08%20PM/Ch-XXVII-8-b.pdf> for the text of the Protocol.

Biography

Philippe Desmeth, by training a bio-engineer and environmental advisor, gained field experience in agro-industrial production and continuing education for farmers in West Africa and Southeast Asia. He worked for several years in the private sector in financial departments. After having completed a postgraduate training in environmental science, he worked for NGOs, including the World Wide Fund for Nature as scientific officer. He was research assistant at the Université Catholique de Louvain, then joined the Belgian Coordinated Collections of Microorganisms (BCCM) in 1996 as international cooperation manager. At the Belgian Science Policy Office that funds and runs BCCM, he was also involved in the management of the Belgian Biodiversity Platform (www.biodiversity.be) which supports research in biodiversity and is the Belgian node of the Global Biodiversity Information Facility. To frame equitable long-lasting collaboration with institutions in developing and developed countries, he develops standard procedures and equitable cooperation schemes. He has gained some expertise in access and benefit sharing in the context of the Convention on Biological Diversity. He coordinates EU-funded projects such as MOSAICC and MOSAICS (www.belspo.be/bccm/mosaicc and www.belspo.be/bccm/mosaics). In October 2010 he was elected President of the World Federation for Culture Collections (WFCC).

ASM 2011

4–8 July 2011

Hotel Grand Chancellor, Hobart, Tasmania

ASM 2011:

Microbiology on the Edge