



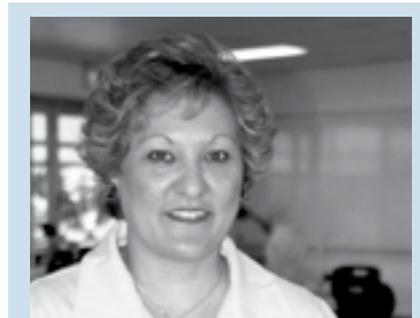
From culture collections to biological resource centres

As defined by the Organization for Economic Cooperation and Development (OECD), biological resource centres (BRCs) are an essential part of the infrastructure underpinning life sciences and biotechnology¹. They consist of service providers and repositories of living cells, genomes of organisms, and information relating to heredity and the functions of biological systems. BRCs contain collections of culturable organisms (e.g. genomes, plasmids, viruses, cDNAs), information on viable but not yet cultured organisms, cells and tissues, as well as databases containing molecular, physiological and structural information relevant to these collections and related bioinformatics².

BRCs must meet the high standards of quality and expertise demanded by the international community of scientists and industry for the delivery of biological information and materials. They must provide access to biological resources on which R&D in life sciences and the advancement of biotechnology depend².

As stated by the OECD, BRCs will form a vital element in a sustainable international scientific infrastructure, and are necessary to underpin the successful delivery of the benefits of biotechnology. They are fundamental to the harnessing and preservation of the world's biodiversity and genetic resources, as well as being part of the key infrastructure supporting biotechnology, bioprocessing and the development of new approaches in the prevention, diagnosis and treatment of disease². They also have a vital role in ensuring the safe and regulated use of organisms that are known pathogens to humans, plants or animals.

The BRC is the next generation culture collection that keeps pace with user requirements, functioning through internationally accepted operational criteria as well as meeting international



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rules, regulations and national legislation. OECD, under the leadership of a Committee for Science and Technology Policy, has established a taskforce on BRCs². This taskforce is currently undertaking steps to secure an international infrastructure for the proper maintenance and exchange of biological resources since they represent the fundamental starting material for biological science.

Accordingly, the establishment of a Global Biological Resource Centre Network (GBRN) has been proposed, with the focus on the improvement of international access to high quality biological materials and data². This network will be complementary to the existing Global Biodiversity Information Facility (GBIF).

Capacity building is essential to transform the culture collections into BRCs³. Currently, all around the world, efforts are being made towards the realisation of this network. The MOSAICC (Micro-Organisms Sustainable use and Access regulation International Code of Conduct) project was designed as a tool in Belgium for microbiologists to implement the Convention on Biological Diversity at the microbial level, in accordance with

other relevant rules of international and national laws⁴. Other European initiatives, including MINE, CABRI, EBRCN and ENBI, work towards the rapid electronic access the data held in expert centres for the use of researchers⁵.

The International Centre for Biotechnology at Osaka University, Japan, supports activities for capacity building and network functions as a base of international programmes between Japan and Asian countries⁶. The Vietnamese government has also started a priority policy for science and technology development for the maintenance of genetic material originating from biological resources⁷. In Taiwan, the Culture Collection and Research Centre (CCRC) was restructured as the Bioresource Collection and Resource Centre (BCRC) to accommodate the expanding cell collections and genetic resources⁸. In the Philippines, a Network of Microbial Culture Collections (PNMCC) is involved in resource sharing and capacity building⁹.

In Australia, it is currently recognised by the State and Federal governments that research and information are the key tools to balance both the environmental, social and economic values in managing biodiversity as well as the conservation and recovery plans for endangered species and heritage areas^{10, 11}. Accordingly, in this context, microorganisms are now gaining importance as prime sources of material on the route to *Biodiscovery, Biotechnology and Biobusiness*.

However, although in line with the National Strategy for Ecologically Sustainable Development, the Australian Federal and State governments are taking steps towards the sustainable use and commercialisation of the unique Australian biodiversity, no efforts have been made so far to support the creation of a resource network to map the unique microbial diversity (resulting from Australia's geological separation



from other continents for over 20 million years) and its sustainable use, nor provide resources to the Australian Collection of Microorganisms (ACM) to assure the long term preservation of Australian microbial resources.

Sole efforts have been made by Assoc Prof Lindsay Sly at the University of Queensland towards the establishment of an Australian Microbial Resources Research Network <http://www.cbit.uq.edu.au/amrrn/>. The network will develop integrated access to Australian microbial resources – including microbial cultures, bioinformation, and research expertise – through the development of a network of ACM and an Australian Microbial Resources Information Network (AMRIN) ¹².

The proposed network will also develop links between Australian and international researchers working on microbial diversity, taxonomy, identification and ecology of microorganisms. The aim is to foster collaborative biodiscovery and utilisation of Australian microbial resources in biotechnology and innovative bioindustries through an Australian Microbial Resources Study (AMRS) research programme.

In order to complement the AMRRN initiative, a microbial library has been established at the University of the Sunshine Coast utilising the geographical resources of Queensland, the most biodiverse State of Australia ¹³⁻¹⁵. The library contains over 3000 microorganisms which are actinomycetes (Figures 1-3), non-actinomycete bacteria, fungi

and bacteriophages. It will develop as part of the proposed network through the development of a database which contains eco-taxonomic information on the isolates.

As well as providing a reservoir of strains for biodiscovery in the State of Queensland, the library also contributes to the ongoing efforts of the Queensland government to map that State's unique microbial diversity, to attract biotechnological investment, and to support the development of State and nationwide policies for the conservation of the unique Australian microflora ¹³⁻¹⁵.

Adequate funding is required to achieve high standards and assure sustainability in BRCs ². In Australia, the route to take part in a global biological resource centre will start with the establishment of an Australian microbial resources network. Accordingly, with the publication of this issue, I am hoping that, on the research and legislative levels, efforts will be made to ensure that Australia does not stay behind the ongoing international efforts outlined here and that the proposed Australian Microbial Resources Research Network will get the formal recognition it deserves.

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Figures 1-3: Mapping the culturable diversity of Micromonosporae associated with the intertidal zones of the east coast of Fraser Island, Queensland. Kurtböke DI, Neller R (USC, Australia) & Robde M (GBF, Germany).

