



AMRIN: working together for Australian microbial resources

Introduction

AMRIN, the Australian Microbial Resources Information Network, is an initiative of the Australian Microbial Resources Research Network (AMRRN) and was developed to aid microbiologists access information on microbial cultures and related expertise and research facilities in Australia.

Biological resources centres (BRCs), comprising collections of microorganisms and genetic material, have been increasingly recognised for their fundamental role in underpinning research and analyses in many scientific disciplines, as well as applications in biotechnology and industry^{1,3}.

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AMRIN aims to provide electronic access to information on the location and characteristics of Australian microbial resources and to facilitate scientific advances and efficiency through collaboration.

Culture collections in Australia

A review of culture collections in Australia⁴ concluded that there was an urgent need for a network of adequately funded culture collections to conserve and supply Australian microbial cultures for use in science, industry and education, and that electronic access to information on the cultures in these collections needed to be developed as a matter of priority.

Many countries have developed national collections to meet their scientific and industrial needs. Australia, on the other hand, has depended on institutional collections to meet the needs of their host institutions, with little national perspective and coordination, except for some plant pathology collections and herbaria. Australia has approximately 50 culture collections listed with the World Federation for Culture Collections World Data Centre for Microorganisms (WDCM). Some 10 of these could form the core of a coordinated Australian Collections of Microorganisms (ACM), covering a broad range of microbial diversity. In addition, many specialised research collections also contribute to valuable resources but often are difficult to locate.

Access to information on cultures held in Australian culture collections is extremely limited. Few collections have the resources to publish catalogues and those which exist are often out of date. A few collections have developed web accessible catalogues which is the way of the future. The WDCM species directory of Australian culture collections provides the most up to date species information, but access to strain data of cultures in the collections is not currently available. Access to this information is urgently required.

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AMRRN

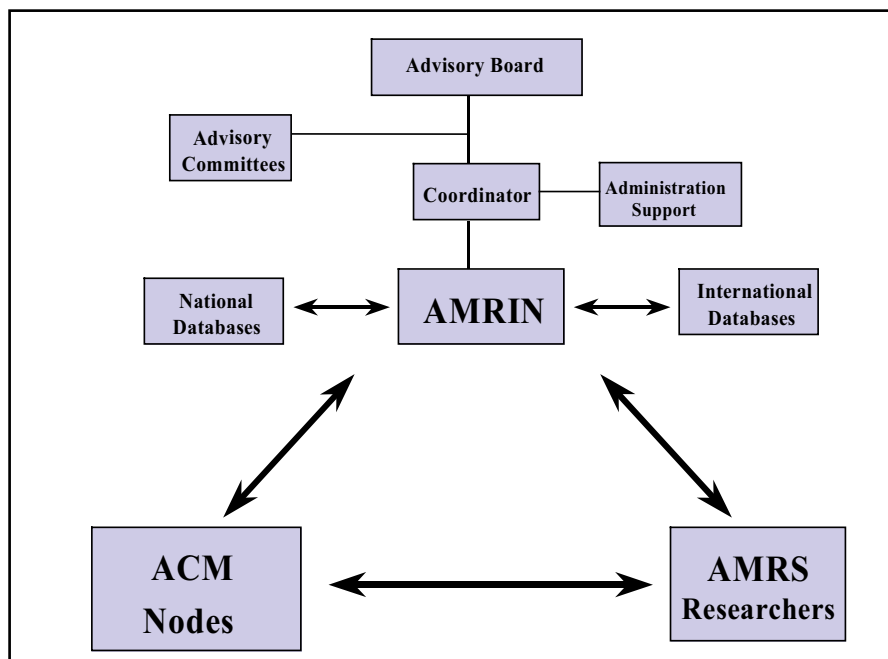
In 2004, the AMRRN was established with seed funding from the Australian Research Council Research Network (ARCRN) scheme⁵. The vision of this initiative is to develop a world class research network to discover and exploit Australian microbial resources and to make these resources and associated information available for applications in science, research, industry and education. The AMRRN will link and support researchers working in a range of disciplines, including microbial diversity, taxonomy, evolution and genomics, ecology, identification, culture collections, bioinformatics, biodiscovery and biotechnology.

The AMRRN will deliver its objectives through three programmes:

- AMRIN – to facilitate access to information on Australian microbial resources.
- ACM – to conserve and supply valuable cultures.
- Australian Microbial Resources Study (AMRS) – to study Australian microbial diversity.

Initiation of these programmes will provide an impetus to Australian research and development by overcoming long-standing deficiencies in infrastructure which impede researchers' access to microbial cultures and information on these cultures⁶. The proposed integration and coordination of the network programmes is shown in Figure 1.

Figure 1. Proposed coordination of the AMRRN showing the central position of AMRIN and integration of the other proposed ACM and AMRS programmes.



AMRIN

AMRIN is the first programme to be developed by the AMRRN. Its prime objective is to provide integrated internet access to Australian collections of microorganisms and bioinformation databases to meet national research needs and to support the competitive development of the life sciences and biotechnology in Australia. AMRRN will link researchers and foster the discovery and exploitation of Australian microbial resources for applications in research, industry and education.

The AMRIN website (www.amrin.org) has been established recently using information provided by participants of the AMRRN. It brings together information on the research strengths of participants covering the breadth of Australian microbial diversity and scientists responsible for maintaining valuable collections of microbial resources. Participants come from all States and Territories, and from a range of institutions including universities, research institutes and government laboratories, with complementary research interests and expertise.

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Table 1. Survey information provided by AMRIN participants.

CONTACT DETAILS	OTHER
NAME	List up to 10 additional Key Words
ORGANISATION	which describe the specific taxa you
TEL	research
FAX	
EMAIL	ENVIRONMENTS (More than one may
WEBSITE ADDRESS	be ticked)
	TERRESTRIAL
FIELDS OF INTEREST (More than one	FRESHWATER
may be ticked)	MARINE
MEDICAL	HUMAN
VETERINARY	ANIMAL
AGRICULTURAL	PLANT
PATHOLOGY	INSECT
ENVIRONMENTAL	FOOD
INDUSTRIAL	
QUALITY ASSURANCE	OTHER KEYWORDS
FOOD MANUFACTURE	List up to 10 key Words which
FOOD SAFETY	describe the specific environments
WATER QUALITY	you research or investigate
WATER TREATMENT	
WASTE TREATMENT	METHODOLOGIES
BIOREMEDIATION	List up to 10 Key Words which describe
PHARMACEUTICAL	the specialised methodologies and
EDUCATION	equipment available
BIOSECURITY	
BIODISCOVERY	SERVICES
BIOTECHNOLOGY	CULTURE ISOLATION
DIAGNOSTICS	CULTURE IDENTIFICATION
MOLECULAR BIOLOGY	MOLECULAR TYPING
MICROBIAL DIVERSITY	PHYLOGENETIC ANALYSIS
MICROBIAL GENETICS	DNA BASE COMPOSITION
PHYLOGENY	DNA-DNA HYBRIDIZATION
EVOLUTION	DNA SEQUENCING
SYSTEMATICS	FATTY ACID ANALYSIS
TAXONOMY	PROTEIN PATTERNS
CLASSIFICATION	SEROTYPING
NOMENCLATURE	CLONE LIBRARY ANALYSIS
	CULTURE COLLECTION
OTHER	CULTURE SUPPLY
List up to 10 additional Key Words	CULTURE SCREENING
which describe your specific fields of	INOCULA
research or application.	MICROBIAL CULTURE
	CELL CULTURE
MICROORGANISMS AND CELL	FREEZE DRYING
CULTURES (More than one may be	CRYOGENIC STORAGE
ticked)	SAFE DEPOSIT
BACTERIA	
FUNGI	OTHER
YEAST	List up to 10 additional Key Words
VIRUS	which describe the specific services
PHAGE	available or methods used in your
PARASITES	laboratory
ANIMAL CELLS	
HUMAN CELLS	OTHER KEY WORDS
INSECT CELLS	
PLANT CELLS	PERSONAL MESSAGE
	Provide a message which describes
	yourself and your research or
	professional activity

New participants are invited to join AMRIN to expand the AMRRN into a comprehensive and growing resource providing integrated electronic access to all culture collections, microbial resource researchers, and users in Australia and overseas. Participants provide information by registering online at the website and then completing an information survey (Table 1). Refinements to data collection and participant access for up-dating their personal information is currently under development. Information is made available to AMRIN users through a search facility on the website.

The website will be the means to facilitate exchange of information between participants and to communicate information on publications, guidelines and meetings. The website provides electronic links to participants' personal websites, to culture collections in Australia and overseas, other culture collection networks, and microbial diversity facilities. Future developments will include discussion forums on topical matters of interest to participants and users. The long-term aim of AMRIN will be to provide an up to date inventory of the biogeographic distribution of Australian microbial and genetic resources.

AMRIN will improve efficiency by speeding access to cultures, avoiding the unnecessary importation of cultures, and minimising costs associated with the purchase, shipping and quarantine compliance.

Why is AMRIN needed?

Microbial cultures and associated information databases on phenotypic, genotypic and ecological characters underpin most areas of research in microbiology, molecular biology and biotechnology and enable progress in these and related disciplines. The key role of culture collections and biological resources has been recognised in recommendations to the Australian government and include the *National strategy on the conservation of Australia's biological diversity* ⁷, the House of



Representatives Standing Committee on Primary Industries and Regional Services' report on *Bioprospecting: discoveries changing the future*⁸, and the OECD Directorate for Science, Technology and Industry, Committee for Scientific and Technological Policy report on *Biological resource centres: underpinning the future of life sciences and biotechnology*¹.

These reports recognise the importance of microorganisms as a source of new frontier opportunities for bioindustries in Australia. They emphasise the need to strengthen and support culture collections of microorganisms to provide the necessary resources to underpin the life sciences and the development of a strong and competitive biotechnology sector. They demonstrate the importance of the fields of microbial biodiversity, microbial resources, bioinformatics and biotechnology, but also highlight that these fields are interdependent. Furthermore, they demonstrate the need for a national resource to integrate and link researchers in these fields and provide access to information. AMRIN has been established to meet this need.

In the *National strategy on the conservation of Australia's biological diversity*⁷, recommendations were made to strengthen ex-situ conservation by:

... establishing or strengthening networks of culture collections of microbial species, including those of medicinal, agricultural and industrial importance...

and to

... accelerate research into taxonomy, geographic distribution and evolutionary relationships of Australian terrestrial, marine and other aquatic plants, animals and microorganisms, priority being given to the least known groups, including non-vascular plants, invertebrates and microorganisms...

Further, the report by the House of Representatives Standing Committee on Primary Industries and Regional Services

in August 2001 on *Bioprospecting: discoveries changing the future*⁸, recognised that, in order to overcome impediments in establishing Australian bioindustries, there was a need for more funding to maintain and expand existing collections so that they provide comprehensive coverage of Australian biota, including microorganisms. In addition, it recognised that funding for digitising and networking information was needed to provide the necessary infrastructure and skills for efficient access to information about Australia's biota.

Working together

There has been a strong desire by microbiologists over many years to improve access to information on specific cultures available in Australia. The need for adequately resourced culture collections and access to the associated information is recognised by the major biological scientific societies, and the current initiative has their strong support.

The willingness to work together was evident during the establishment of the AMRRN in 2004 and this enthusiasm has carried forward into developing AMRIN. The challenge now is to ensure that AMRIN becomes a fully comprehensive facility by recruiting all potential participants and developing the facilities to meet users needs. Not only will this provide the valuable information required, it will demonstrate to policy makers and funding agencies the relevance, utility and need of this resource for the competitive development of science and biotechnology. Adequate funding to support the capture, validation and digitising of culture collection data is essential for AMRIN to reach its full potential.

AMRIN is an enabling initiative which brings together existing resources, while providing a framework for future development and funding initiatives. It will provide a means to encourage researchers to accession valuable cultures

in collections for future research and exploitation, as well as making available reference and control cultures used in standard methods of analysis. Thus, AMRRN will establish essential basic collaborative infrastructure to meet national strategic needs in the life sciences, biotechnology, industry, and educational sectors. It will commence a process to overcome a long recognised deficiency in Australian scientific infrastructure not addressed by previous programmes⁶, and will foster the sharing of information and resources for innovative research.

Acknowledgements

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