

The United Kingdom National Culture Collection (UKNCC): microbiological resources to meet your needs

David Smith

The UK culture collections have recently undergone a stringent review. David Smith describes the new system that is now in place and the services that are available from the UKNCC.

It is over 50 years since the network of UK national collections was first established, placing collections of organisms at centres of expertise and embedding them in research and development areas based on the use of the organisms they held. Over the years the collections have increased their holdings to more than 70,000 microbes and cell lines. These play an important role in preserving the results of microbiological research and providing the tools for biotechnology. During the late 1980s it became clear that the collections were not being used to their maximum potential. A UK Government-sponsored review was set up to assess the collections and identify ways of developing their activities to provide better support for user groups. The review recommended central co-ordination of the collections by establishing a federal UK National Culture Collection (UKNCC) under the aegis of the Biotechnology and Biological Sciences Research Council (BBSRC). The CABI Bioscience Genetic Resource Collection has been playing a key role in the implementation of the UK Government's strategy for UK microbial collections over the past three years. This initiative co-ordinates some of the activities of nine National Collections (one on two sites) under the UKNCC. However, the collections still retain their own identity and their existing relationship to their current funding bodies. Three specific initiatives are under way:

- to improve the profile and marketing of the collections;
- to fund a molecular characterization programme;
- to establish an animal virus collection.

The collections are co-ordinated through a Memorandum of Understanding, which commits collection staff to continuing collaborative research, co-ordinated marketing and cataloguing and joint

development of new products and activities. This aims to support the continued survival of this vast and unique resource that underpins scientific development not only in the UK but worldwide. The project came to fruition during the first quarter of 1999. The web site was launched in the first week of January and the microbiological community contacted through brochures and flyers produced to publicize the holdings, source, property and uses data and supporting services available. A public launch of the UKNCC was held at the SGM Meeting in Edinburgh on 15 April 1999.

● Key activities of the initiative

- Establishment of a distributed electronic database
- A unified marketing strategy
- Collaborative research
- Implementation of a UKNCC Quality Management System
- A single point of contact: The UKNCC website (<http://www.ukncc.co.uk>)

These key activities have led to improved access to the catalogues and strain data of the UK public service collections by establishing a mechanism for the user to search collection databases on the UKNCC website. Mechanisms are in place to update the catalogues as data are added and new strains become available from the collections. Internet access to strains and information is backed up by brochures giving details of other services provided by the collections. These publications are distributed through mailings with journals and at key scientific meetings worldwide. Raising the profile of the UK collections enables microbiologists to discover how these long established biological resource centres can help to support research and development. By operating to uniform standards and providing quality products, the UKNCC is striving to improve the service the member collections provide and to make it easier for microbiologists to use these services. In turn, the long-term sustainability of the collections themselves depends upon the microbiologist using the expertise and resources within the collections. Visiting the UKNCC website provides not only a catalogue but also a huge resource of information on growing, preserving and the safe handling and distribution of organisms.

● The UKNCC organisms and services

The collections hold strains of algae, bacteria, bacteriophages, filamentous fungi, mycoplasmas, plasmids, protozoa, animal and plant cell lines and yeasts. They are supplied as reference strains, starter cultures and production strains, and some have specific uses in microbial resistance test strains. In addition to the supply of pure authenticated organisms, the collections accept deposit of published, safe confidential and patent strains, and offer preservation, identification and training services.

The UKNCC member collections

- CABI Bioscience UK Centre (Egham), formerly the International Mycological Institute
- Culture Collection of Algae and Protozoa (freshwater)
- Culture Collection of Algae and Protozoa (marine algae)
- European Collection of Cell Cultures
- National Collection of Pathogenic Viruses
- National Collection of Industrial, Food and Marine Bacteria
- National Collection of Pathogenic Fungi
- National Collection of Plant Pathogenic Bacteria
- National Collection of Type Cultures
- National Collection of Yeast Cultures

● The role of public service collections

The public service culture collection is charged with several tasks:

- the *ex situ* conservation of organisms;
- custody of a national resource;
- provision of a living resource to underpin the science base;
- receipt of deposits subject to publication;
- safe, confidential and patent deposit services.

Collections are in a unique position as custodians of *ex situ* genetic resources and therefore have a key role to play in the conservation of genetic resources. Biologists who collect organisms for their research and publish information on them should make their most important strains available for confirmation of results and future use. Collections add value to received and collected biological material. This is done through purification, expert preparation, authoritative identification, description, determination of biochemical and other characteristics, comparison with related material, safe and effective storage/preservation, evaluation of value for biological control uses, and indication of importance of beneficial and detrimental attributes. They often provide samples of deposited organisms free of charge to the depositor and participate in capacity-building projects to help establish facilities and expertise in-country to maintain *ex situ* collections. Operating within the spirit of the Convention on Biological Diversity, UKNCC seeks to protect the rights of the country of origin of organisms in its collections. Depositors of strains benefit from the added value, secure storage of their isolates and, in particular, relief from the burden of distribution and ensuring the continued availability of the strain.

● Provision of strains and expertise underpins science

Collections have been the source of many technical and systematic publications and provided organisms that have underpinned several new scientific hypotheses and discoveries. For example, a 'new' cucumber disease caused by an *Agrobacterium* sp. causing root proliferation has recently come from nowhere to be regarded as the most serious disease in UK crops. The National Collection of Plant Pathogenic Bacteria (NCPBB) showed that the pathogen was identical to NCPBB strains isolated sporadically over the last 25 years, proving that it is not new, merely adapted to the current ways of growing cucumbers in rockwool. This fact has enabled NCPBB to suggest control means perhaps much more quickly than if there had been no previous record.

The UKNCC member collections cover a wide range of micro-organisms and their activities often lead the way in many fields. Most people are only aware of the yeasts used in brewing and baking. In fact, over 800 different biological species have been described and

thousands of different varieties are known to exist in all kinds of natural and artificial habitats. The National Collection of Yeast Cultures (NCYC) maintains a vital research and reference collection. Recent examples of the value of this collection include the identification of a new species of food spoilage yeast and the molecular characterization of emerging pathogenic yeasts of the genus *Saccharomyces*.

This spoilage yeast, isolated from wine and orange juice, has exceptional resistance to food preservatives and represents a significant economic threat. The organism, and the risks associated with it, are being investigated in a collaboration between NCYC and Unilever Research, Colworth. Virulent *Saccharomyces* yeasts are being analysed as part of a BBSRC-funded collaborative programme in comparative genomics with UMIST and the University of Oxford. Fundamental information concerning their evolution is having wide scientific impact, extending from the characterization of emerging microbial threats into biotechnological applications of yeasts and functional genomics. The NCYC collection and associated expertise in taxonomy and phylogenetic analysis are proving extremely valuable to such studies.

The UKNCC also supports medical research, particularly in the UK. The *Escherichia coli* O157 outbreak in Scotland gained wide media coverage and the organism was re-classified in ACDP Hazard Category 3. The National Collection of Type Cultures (NCTC) responded by making a non-cytotoxin-producing strain, NCTC 12900, available, which could be handled safely under Category 2 conditions for those requiring a strain of this organism for quality control purposes.

It is evident that the UKNCC has provided vital information and research tools in the past and will continue to do so. The struggle for survival of collections continues but together the UKNCC members will meet the challenges the future brings with relish. Why not visit the website and learn more about what the collections have to offer?

● Dr David Smith is Curator of the Collection at CABI Bioscience UK Centre (Egham), Bakeham Lane, Egham, Surrey TW20 9TY. Tel. 01491 829 046; Fax 01491 829 100 e-mail d.smith@cabi.org