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Algal culture collections in the omics age

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Algal culture collections act as specified resource centres and international depositories for cyanobacteria and eukaryotic algae. They underpin and actively contribute to research, teaching and biotechnology with well-defined reference strains, associated data and broad expertise in isolation, identification and *ex situ* conservation. In this way, they are adding value to known and as yet unknown algal biodiversity, and contributing to the growth of the bioeconomy and bioscience by helping to exploit novel sources.

Today, there are around 40 public algal culture collections. Of those registered in the World Data Centre for Microorganisms (WDCM), over 15,000 culture strains from ~5000 species are available. The collections are widely dispersed across the planet but face common issues, so once in a while it's highly beneficial for those looking after them to meet for networking, sharing of best practices, developing collaborations and promoting interaction. After successful meetings held in 1998 (USA), 2002 (Germany) and in 2008 (UK), we decided that it was time to arrange another such meeting and were able to hold a session and satellite meeting at the seventh European Phycological Congress (Zagreb, Croatia, Seventh European Phycological Congress, 2019).

On 27th and 28 August 2019, curators from 28 public algal culture collections in USA, Canada, Japan, Australia, China, Malaysia, Norway, France, Belgium, Germany, Italy, Czech Republic, Poland, Algeria, Israel, Russia, Croatia, Chile and the UK got together and discussed common challenges. These included talks on: how we can sustain collections' funding in the decades ahead; new applications, for example seaweed biobanking, and widening the biodiversity to include entities such as aquatic viruses; maintenance and cryopreservation methods; genome sequencing projects; collections as an educational resource; the Nagoya Protocol; and Quality Assurance.

The introduction of omics technologies, the rapid expansion of molecular toolboxes for (new) model

organisms and increasingly non-model organisms, and the surge in biotechnological research, inspire algal culture collections to respond to these developments and expand their activities. Today they are vital for many areas of phycological research.

The Collections maintain:

- Reference strains for genomics research,
- Reference strains for novel biotechnology applications,
- Biobanks for seaweed farming,
- Patent depositories if signed up to the Budapest Treaty,
- Confidential deposits.

The Collection staff:

- Provide training through courses and on a one-to-one basis,
- Offer strain identification services,
- Host research in preservation methods and taxonomy,
- Provide advice on access and benefit sharing regulation (Nagoya Protocol).

Collection websites provide:

- Strain data, images and references,
- A wide range of data on chemical profiles,
- Links to genetic barcodes and genome sequences,
- Culturing and cryopreservation methods,
- Culture media recipes.

Altogether, this enables algal culture collections to help generate solutions to societal challenges by stimulating interaction between academia and bioindustry.

We were delighted to be invited by the Managing Editors of this new Applied Phycology journal, Professors

Juliet Brodie and Christine Maggs, to launch the journal with a “special edition” based on the talks at the Collection meeting.

Disclosure statement

No potential conflict of interest was reported by the authors.

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