

# CREATIVE COMMONS, OPEN ACCESS, AND LIVING CULTURES

It has now been just over a year since the Nagoya Protocol went into force, and many of you have heard concerns expressed about its potential effect on research. Many countries protect their biological resources by restricting or preventing export of living material; Nagoya strengthens this, applies to all groups of organisms, establishes procedures for “fair and equitable sharing of benefits”, and defines enforcement protocols. As of this writing, 62 countries have ratified, accepted or approved the Protocol, about 50 have signed the original declaration but have not proceeded further, and about 80 countries, including several who actively enforce the 1992 Convention on Biological Diversity (CBD), have done neither. Both the CBD and Nagoya benefit the developing world by recognizing that biological resources are sovereign property of countries of origin, and providing legal and economic frameworks for sustainable exploitation of these biological resources. What now needs to be developed is a mechanism that allows public good international scientific research to progress, while continuing to protect intellectual property and economic development rights. Long standing scientific standards in microbiology include the deposition of cultures, especially taxonomic types, in public collections as a requirement to support publication. This also needs attention.

The situation is analogous to commercial publishing, where copyrighted works are the commodities rather than biological resources. Copyright is governed by an intricate mixture of national and international laws and is often subject to a similar conflict between commercial and academic interests. Although formal exemptions are often made for fair use in teaching, many academics quietly bypass copyright and distribute copies of publications to colleagues; “pirated” copies of books are a reality. The development of the related concepts of Creative Commons, free Open Access (rather than OA for a fee), and Open Data were inspired by historical ideas of Public Domain copyright, and attempt to create an arena where the free sharing of ideas, data and publications for non-commercial use is legal and encouraged.

Biologists have long treated cultures in ways that parallel publishing. Some

cultures have great commercial value and are carefully preserved and protected under regulations under the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure, which came into effect in 1981. But to most scientists, cultures are research subjects, reference vouchers (e.g. ex-types), teaching material, and more profoundly, doorways to exploring the microscopic world that enable the development of new ideas, new research and sometimes dramatic discoveries. What is missing in the CBD and Nagoya is acknowledgement that non-commercial use of biological resources is critical for international public good research and for education. By default, because of the need to protect sovereign rights, all research is treated as if it is commercial.

Could the same Creative Commons (CC) concepts and processes be applied to living cultures in some circumstances? In publishing, permission to engage in either commercial or non-commercial (NC) activity is explicitly stated by the owner of the resource. Whether that resource can be modified or included as a component in other commercial or non-commercial activities is also defined. The credit expected by the originator of the resource (BY=Attribution) and the requirement that anyone receiving the resource second hand is bound by the same conditions (SA=Share Alike) is

defined up-front (summarized in Fig. 1). For cultures originating in countries that either do not enforce the CBD or explicitly choose not to enforce Nagoya for non-commercial

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Fig. 1. Different kinds of Creative Commons licences relevant to copyright issues, with the ‘flavours’ that might be applicable to Open Access cultures highlighted. Note that these explicitly exclude any commercial application. Rearranged from [creativecommons.org/licenses](http://creativecommons.org/licenses), where further details, including complete legal documents supporting each kind of licence, can be obtained.



Fig. 2. Keith Seifert (left) with his colleague and former post doc Damodar Shenoy (right) of the National Institute of Oceanography, Visakhapatnam, India, in the Western Ghat mountains, October 2015 (photo: Ashish Prabhubaonkar).

research, it could be as simple as putting check boxes on culture deposit forms, allowing the original owner to designate their cultures as CC-BY-NC-SA (Fig. 1). If this could be done legally, researchers would declare their intentions in writing and ensure that they comply with their employer's requirements, funder's policies, and national laws, each time they submit a culture to a public culture collection. For biological resources originating in countries that have signed the CBD or Nagoya, and choose to enforce it, individual researchers who isolate cultures presently lack the legal authority to deposit them in international

collections in support of publication requirements, or to make them available to collaborators in other countries. As advocates of Open Research, we need to find a way for public good researchers in all countries to participate in the development of mechanisms so that their cultures can be designated as Open Access for public good research or teaching, while respecting the requirements of the Treaty and Protocol.

There are many complexities. How can we avoid unintentional interference with intellectual property rights for unanticipated applications of cultures discovered after the publication of academic research? Can quick, precise strain typing mechanisms be developed to enforce the intended creative commons application of open access strains? The best public

culture collections have staff that isolate new strains, repeatedly observe strains, and develop new data to enhance the value of the strains. They already suffer from an increasing burden of legal paperwork as they cope with increased national and international regulations; perhaps a system parallel to the Creative Commons would simplify this.

In the meantime, however, all who work with living biological materials must conform to the legislation enacted by international governments (e.g. Verkley 2015). As I learned during my recent travels on behalf of the IMA in India (Fig. 2), a

country that enforces CBD and Nagoya rights rigorously, rewarding collaboration is possible and can stimulate the installation of modern scientific capacity, such as DNA sequencing or state of the art analytical chemistry, to further that collaboration. Scientists in the developing world are eager to work with international colleagues. In India, mechanisms exist to negotiate the legal transfer of biological material across borders, but this is not true for all countries. Perhaps the application of some of the Creative Commons concepts discussed here can further facilitate this to the great benefit of international mycology and microbiology.

Over the next few months, the IMA will be reaching out to other national and international bodies representing scientists who use microbial cultures, and to the representatives of the Creative Commons movement, to campaign for mechanisms to be developed that will enable the possibility for legal designation of selected cultures as Open Access. This will be an onerous country-by-country task because implementation of the protocol is at the national level and may require amendments to the Nagoya protocol, but we should not shirk this task. We hope that you will support the IMA in this, with the aim of stimulating the safe, legal exchange of microbial cultures among researchers for use in public good research and teaching, while protecting the sovereign rights of all countries.

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Verkley G (2015) How will the Nagoya Protocol affect our daily work? *IMA Fungus* 6 (1): (3)–(5).

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