

Opinion on the discussion to limit the use of digital sequence information from genetic resources in the future within the framework of the Nagoya Protocol and the Convention biodiversity

In the discussion about the use of digital sequence information (DSI) there is a basic difficulty in the lack of definition of the term. The Technical Expert Group report (CBD/DSI/AHTEG/2018/1/4, page 5) provides information on genetic resources very broadly and extends it even to biochemical and contextual information, for example, on morphological, taxonomic, ecological or functional information. Before that, the term DSI must be defined very precisely, and a possible extension to biochemical and contextual information should be rejected.

For the protection and conservation of species and ecosystems, DSIs are essential in the taxonomic, nature conservation and ecological research. Research on genetic Diversity of a species such as detailed characterization of its populations on the basis of their DSI, or taxonomic research on the basis of the DSI of the species, are central components of biodiversity research and serve to improve the protection of species and Populations (Objective 1 of the Convention on Biological Diversity, or CBD) (see Prathapan et al., 2018). Evolutionary biology uses thousands of sequences to calculate the pedigrees of species; drug research analyzes large datasets of DNA sequences. In the Life Sciences, DSI are indispensable in structural biology, plant breeding or in the synthetic biology. They are all based on large data sets of DNA sequences, expression analysis or metabolite analysis. Obtaining prior approval in the country of origin for each individual DSI would be an insurmountable obstacle for extending knowledge resulting from research on biodiversity as well as in life sciences.

If the use of the DSI from genetic resources is subject to the Nagoya Protocol (NP) and the CBD, open access to DSI would be restricted. Researchers in Switzerland would be confronted with far-reaching consequences. Therefore, they would like to warn on far-reaching consequences for the environmental sciences and life sciences as well as biodiversity research.

- International scientific collaboration in these areas would be considerably impeded which, among other things, would also hamper researchers in low-income megadiverse countries, which are often particularly vulnerable to such collaborations (Deplazes-Zemp et al. 2018, Pradhapan et al., 2018). Research on the genetic resources of the countries of origin themselves would be affected, as they would no longer benefit from the Open Access practice and it is to be feared that international research will in future mainly be carried out in countries that do not have ratified the NP.
- Researchers in Switzerland are of the opinion that it is necessary to promote the free exchange of information through open access to DSI in databases, such as the GenBank and EMBL/EBI. The treatment of DSI as a joint and freely accessible material is essential for scientific research for the protection of the biological diversity and to secure the basis for life, health and nutrition of society and thus benefit the whole Humanity.
- Joint efforts undertaken so far to achieve greater transparency and openness of science (e.g. the European Open Science Cloud Declaration) and for a

basic open access to data from publicly funded research, e.g. the Open data policy of the Swiss National Science Foundation (SNF.ch) would be – at a minimum – reversed. Since the databases are the product of research activities, scientific curating and generous, mostly public financing, these benefits already provided should also be taken into account (in the overall benefits of the NP). For the operation and the use of digital Databases and globally networked research and information infrastructures would also result in considerable additional costs as well as major technical Challenges to specifically regulate access to each DSI.

- Specialized journals refuse to accept manuscripts unless the primary data are uploaded into the relevant databases. Restrictions on the use of DSIs could therefore affect the publications of the prevent research results and would be in conflict with the rules of good scientific practice. This would also threaten the replicability and validation of scientific results. The scientific disciplines concerned as well as all Researchers would be severely restricted in their research activities. Open Access journals and repositories would be particularly affected.
- The Swiss researchers generally welcome the NP, which entered into force in 2014, but point to problems with the implementation of the NP for non-commercial research (see also Prathapan et al., 2018). Research can determine the correct access to genetic resources in some Member States not yet available or only available because the agreed "Access Benefit Sharing" (ABS) obligations because laws and access rules are only partially implemented. The implementation of the NP Protocol means, from the point of view of research that the countries/providers should Issue a Prior Informed Consent (PIC) and thus the conclusion of contracts (Mutually Informed Consent) Agreed Terms, MAT). Currently, very few approvals and ABS contracts have been concluded so far with existing national providers regulations. From the 14 countries with valid ABS regulations in 2015, in the period 1996-2015, an average of 2 ABS contracts have been established both for commercial and non-commercial research per year and country (Pauchard 2017). Research relies on the national ABS authorities to work with personnel capable of handling commercial activities from non-commercial ABS activities, and is familiar with the research environment and its framework conditions (publication pressure, time limited funding, Open Access initiatives etc.).
- In addition, the probable multiplicity of origins of the DSI would make the calculation of the marginal profit of a potential commercial use for the countries of origin almost impossible.

Researchers in Switzerland are asking all participating federal offices, institutions and Member States to ensure that the Nagoya Protocol does not extend the restriction of the use of the digital sequence information. The effects would jeopardize scientific progress and would be in contradiction with the rules of good scientific practice.

Only without virtually insurmountable obstacles in international cooperation will the non-commercial research continue to be able to provide knowledge for the protection and sustainable use of biodiversity, as well as safeguarding the basis of life, health and nutrition of society.