

**An analysis of the implications of intellectual property rights (IPR) on
the *Global Biodiversity Information Facility* (GBIF)**

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An analysis of the implications of intellectual property rights (IPR) on the *Global Biodiversity Information Facility (GBIF)*

Executive Summary.

Data and information have always been extremely powerful tools in the building and development of societies. In the context of science, both data and information are essential building blocks for its progress and advancement. In the past two to three decades, Information Technology (IT) has emerged as the greatest influence on the generation, organization, management, release and flow of data and information.

However, parallel to the explosive growth in the flow of information and enhancement of data generation enabled by IT, political and legal developments in the area of intellectual property rights (IPR), have also begun to have a profound impact on the generation of data and information, the assignment of ownership and management rights to these data, and the conditions under which they be accessed, used, managed and further disseminated.

In many circumstances, data and information are closely linked to private enterprises and economic benefit, as potentially useful commercial or industrial products may be derived from them. These products may subsequently be exploited, often with no or limited recognition of the sources of data and information. Worse, the data sources or providers may be excluded from the economic benefits generated through the use of the data.

Data and information are extremely easy and almost costless (given the IT tools available) to duplicate. This fact gives data generators little incentive to invest in this area. Thus, IPR becomes the incentive – through a conferred legal monopoly – to invest time and resources in producing, electronically disseminating and managing data and information.

The IPR system, responding mostly to pressures by the private sector, is based on and comprises a series of international agreements and national laws. The IPR system has begun to adapt to emerging trends in data and information dissemination and use, and to the development of new technologies which make data and information widely available. However, the traditional protections of copyright, patents, trade secrets and *sui*

generis database protection are still some of the tools that are being utilised to exert control over free, digital flow and dissemination of information.

Indeed, the impacts of the IPR system are far reaching. Even the data and information necessary for undertaking basic scientific research have become subject to certain access and use limitations imposed by and IPR system that was designed with little regard for the needs of the research sector, to protect the private sector.

Under these complex circumstances, the *Global Biodiversity Information Facility* (GBIF) was constituted in the recognition that “ ... *co-ordinated international effort is needed to enable users throughout the world to discover and put to use vast quantities of global biodiversity data, thereby advancing scientific research in many disciplines, promoting technological and sustainable development, facilitating the equitable sharing of benefits of biodiversity and enhancing the quality of life of members of society*” . Generating and processing data, creating useful information and disseminating or making available data and information are all elements of the GBIF endeavour and may –and most likely will– be affected by a new and adapting IPR policy and legal process.

The paper *An analysis of the implications of intellectual property rights (IPR) on the Global Biodiversity Information Facility (GBIF)* identifies and analyses some of the key elements of GBIF’s situation within the evolving IPR universe. It identifies the tensions between the needs of science for the free flows of data and information and the IPR considerations of private interests with regards to this same data and information. Ultimately, for science to continue building and progressing, flow of data and information must not be restricted or conditioned. Furthermore, conservation of biodiversity must also be linked to *sound* policy making, which in turn, requires solid scientific foundations to which information and data networks significantly contribute.

The paper also provides some indications about international IPR trends, and how GBIF may adjust its operations – without compromising its mission – to fully comply with this new policy and legal paradigms. Very simply, GBIF will facilitate access to and use of biodiversity data and information with due recognition of ownership (if applicable to specific cases) and will seek to ensure that (as far as practically possible) data users respect these rights and utilise data and information accordingly. Institutional IPR policies of GBIF’s, *Data Sharing Agreements* and *Data Use Agreements* will provide with the overall framework and operational tools to data ownership concerns and interests.

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“Overprotecting intellectual property is as harmful as underprotecting it. Creativity is impossible without a rich public domain”. (Vanna White v. Samsung Elecs. Am. Inc. David Deutsch Assoc. 989 F. 2d. 1512, 1514 (1993), 27 [dissent by Judge Alex Kozinski].

“... information is the lifeblood of a knowledge based economy” (Yu, 2000).

“Firstly, scientists tend to dissociate themselves from the implications of their research. Secondly, scientists have the ability to convince themselves that publication in the academic forum is separate from the world of commerce. Thirdly, most scientists are under very considerable pressure to publish as much as possible as soon as possible” (Milliken, 2002).

“... it is already clear that understanding and concern for legal and IP issues lag far behind the drive and enthusiasm to create databases and interoperable networks of databases and to make [the] specimen data and images available on the Internet” (Scoble, 2002).

“Information technology promises great benefits (and also ills). Benefits from the technology depend on production, purchase and exploitation of its benefits. It can be used to build large data banks to run effective business, government administration and services. The countries which will benefit most from IT are those which are able to control and implement it” (Woherem, 1993).

Introduction.

Information Technology (IT) is having a profound and dramatic impact on most human activities and livelihoods in general. Rapid economic, scientific, social and cultural changes have been substantially influenced by IT. Computers (software and hardware) and communications are the two key and converging components of IT (what the French refer to as “informatics”) (Woherem, 1993). Social and natural sciences have especially benefited from and progressed due to the revolution in methods and technologies to support collecting, analysing, organising, storing, processing and transmitting data and information.

Collecting data from different sources and translating it into meaningful information has made databases an indispensable tool for science (business, scholars, consumers and other sectors) (Yu, 2000). More and more, databases (especially in their electronic form) are becoming critical tools for enhancing scientific advancements and, in general, for the continued process of strengthening a knowledge-based society. These tools and the *science of informatics*, are allowing users to add value and enhance what in normal circumstances would be unrelated, disorganised and incoherent data. However, considerable differences in human and institutional capacities between regions and countries to make use of IT should be also noted and acknowledged.

Achieving the objectives of the *Convention on Biological Diversity* (CBD, 1992) (conservation, sustainable use and equitably sharing benefits from access to and use of genetic resources) and those of many other international environmental and conservation agreements, will depend considerably, although not exclusively, on: a) the generation of **reliable** data and information, b) **accessibility** to appropriate and timely information and data and c) **effective information exchange mechanisms**. Information and data from biological collections and taxonomy are especially important in the context of securing the effectiveness of conservation efforts (Darwin Declaration, 1998). These issues are not only important from a purely scientific perspective but also to support sound and well informed international, regional and national policy and legislation formulation.

Even with the available IT, generating reliable information and databases is, more often than not, an expensive, intellectually challenging and time consuming endeavour (Elste, 2002). Paradoxically, this same IT and the Internet and telecommunications in particular, have made access to and sometimes reproduction of this information a relatively easy, effortless and low cost exercise. IT has created a vast horizon for electronic information goods, tools and services and thus, opened up new markets and business opportunities (Hall,

2002). Public (and private) scientific research institutions are viewing databases as a potential source of revenue, at a time when public funding in basic and applied sciences is in decline in most parts of the world (Ownes, Alyson, Fuscone, 2002). This trend seems to partially explain why proprietary and ownership issues (intellectual property rights – IPR) emerge as part of the process of protecting an intellectual and financial investment in generating growingly important informational research tools.

A key issue is how to ensure that IT does not continue to affect the market failure factor which characterises information goods and tends to favor its under protection (i.e. possibilities for free riders to copy and utilise results of information products and commercialise them at a fraction of their production/generation costs). IPR, exclusive rights, are the typical option used traditionally to overcome this failure. On the other hand, there are also situations where IT investments (and IPR) result in overwhelming market power (i.e. very specialised data providers charging high prices or imposing strict conditions for use of their products) (Hall, 2002; National Research Council, 1997). Given the value and potential of data and information, especially in the context of IT, how to protect this information and overcome market failures mentioned previously becomes a critical consideration.

These factors, translated into the “biodiversity research world”, also highlight a very clear and evident tension between the need to access and ensure research data and information is made available for continued progress in science (especially from public sources) and the interests of those who have made this data and information valuable as a result of its analysis, systematisation and organisation (private and public institutions and a combination thereof).

Today, the boundaries between basic (i.e. purely taxonomic) research and applied research has become very blurred or, at the very least, *when* and *how* basic research starts to become commercially or industrially oriented are more and more difficult to detect. This is where distinctions may need to be made between publicly available data sources and private sources and where different legal *status* of the data and information used may have a bearing on the practical operations of a mega database (i.e. as in the case of the GBIF).

The flow of information has always been at the heart of scientific and technological progress. Even the strictest of IPR instruments (such as patents or plant breeders rights), as part of the bargain with society for the granting of exclusive rights, guarantee (at least in theory) that information and data regarding innovations and new plant varieties for example, are made available for continued research (disclosure and breeders exemptions). Indeed, publishing biodiversity research “... *is an important factor that shapes the flow of*

knowledge and information within different groups, including local communities, academia, industry, the media and the general public” (Laird, Alexiades Bannister and Posey, 2002).

Additionally, another element to consider is the interest (sometimes explicitly recognised and protected through intellectual property) of those whose research (and effort in generating data and information) has become part of a new informational structure, namely a database. The linkages between : source country of biological or genetic resources (and sometimes related information) - data provider – data organiser and distributor – user of data, imply a series of sometimes complex legal relationships which need to be considered and clarified if information flows are not to be unnecessarily stifled.

Although the *Berne Convention for the Protection of Literary and Artistic Works* (1886 and successive Acts) has enabled the use and application of copyright for the legal protection of databases, it is more recent developments such as the *Directive 96/9/EC of the European Parliament and of the Council on the Protection of Databases* (1996) , the *WIPO Copyright Treaty* (1996) with specific references to databases, or the *US draft bill on Collection of Information Antipiracy Act* (1999), among others, which evidence and highlight the policy and legislative efforts to provide database producers with legal protection (and importance of a multi-billion dollar industry world-wide).

This paper seeks to highlight the existing policy and legal context as it applies to the production and protection of databases (whether public or privately oriented) and, in particular, how GBIF – in its initial role as a species and specimen information provider - may relate to or be affected by this policy and legal framework.

1. What is the Global Biodiversity Information Facility (GBIF) and why are access to and release of data and information and intellectual property issues important?

Understanding the *nature* of the GBIF is important to understand the type of services it seeks to provide. The non binding *Memorandum of Understanding* (MoU) of the GBIF (2000) is its “birth certificate” and indicates its specific nature. The introductory paragraph establishes that the signers of the MoU (countries, economies, intergovernmental organisations or country designated organisations) decide that a “... *co-ordinated international effort is needed to enable users throughout the world to discover and put to use vast quantities of global biodiversity data, thereby advancing scientific research in many disciplines, promoting technological and sustainable development, facilitating the equitable sharing of benefits of biodiversity and enhancing the quality of life of members of society”*.

In this regard, although not binding *per se*, the clear and express spirit of the GBIF is to create a mechanism which facilitates technical and scientific international co-operation. The GBIF is quite clearly a non for profit mechanism, designed to support the common good ultimately through conservation. However, inevitably, information and data it provides *could*, at some point in time, and depending on specific uses, determine that users of this data and information may be in a position to generate profits and revenue as that information is translated into value added products. It is worth noting the MoU refers to *making use* of biodiversity data and information, promoting *sustainable development* and *sharing of benefits* which could, in certain sense imply uses which could lead to commercial or industrial products.

Another important point is the *type* of data and information GBIF will provide. In this regard, Paragraph 1 (2) of the MoU defines “biodiversity data” as “...*scientific information, primarily about biological species and specimens. At the species level, such data would include the scientific names of the species and all of its synonyms; the common name(s) of the species; and other information about the species, such as description of the species, its physiological properties, its genetics, its geographic distribution, its phylogenetic relationships, its role in the dynamics of ecosystem processes including cases of invasions, its applications , etc. Specimen level data, including samples for molecular analysis, would include the scientific name of the species to which the specimen belongs; information on where the species is currently located; who identified it; what is the specimen number; and other associated information derived from the specimen (e.g. living culture, frozen tissues, photographs, parasites, hosts) and any other related field notes written by the collector of the specimen*”.

GBIF is therefore intended to support basic research and advanced taxonomy which enhance possibilities of carrying out technically viable conservation activities in different parts of the world. Bioinformatics has been described as “... *the science of managing and analysing biological information*” (Pongor, Landsman ,1999). For developing countries, given a minimum degree of research and IT infrastructure (including access to the Internet), access to the products of bioinformatics will be relatively easy provided that bioinformatics knowledge remains in the public domain. Privatisation of knowledge (including databases) through IPR instrument is a clear trend, especially within the private sector. The GBIF could be a way to overcome some of these constraints.

The *Global Biodiversity Information Facility* (GBIF) is established as a result of a specific recommendation by the *Megascience Forum’s Biodiversity Informatics Subgroup* (1996) of the *Organization of Economic Co-*

operation and Development (OECD) which called for the development and creation of a *Global Biodiversity Informatics Facility* (1999). The Subgroup basically concluded that:

- the biodiversity information domain is vast and complex but critically important to society,
- existing biodiversity and ecosystem information is neither readily accessible nor fully useful, and
- recent technological and political developments present opportunities for OECD countries to show leadership in the area of biodiversity informatics.

Thus an international mechanism was needed to ensure that biodiversity data and information is openly and universally accessible (especially through the Internet). COP Decision IV/1 (1998) furthermore suggested endorsement and support for the recommendations of the Subgroup.

In 1999, during the *Meeting of the OECD Committee for Scientific and Technological Policy*, Ministers of the OECD agreed to the formal constitution of the GBIF.

The non binding *Memorandum of Understanding* – with details of GBIF objectives, role and basic operational rules and principles applicable to its participants – was opened for signature in December 2000. By March 2001, the MoU entered into force.

Paragraph 13 (Objectives) of the MoU specifies the purpose of GBIF (1) which is to “... *promote, coordinate, design and implement the compilation, linking, standardisation, digitisation and global dissemination of the world’s biodiversity data, within an appropriate framework for property rights and due attribution* [...]”. The GBIF is to work in close coordination with other existing and established programs that compile and disseminate biodiversity related information, such as the *CBD Clearing House Mechanism* or the *Global Taxonomic Initiative*.

As with the CBD which recognises in a number of its provisions that IPR may play a conditioning role or have an impact in various areas (i.e. access to and transfer of technology), point 1 of Paragraph 13 of the GBIF MoU specifically recognises and expressly highlights that compiling and disseminating biodiversity related data could have implications in regards to proprietary and ownership rights regarding this data and information which is made widely available on the Internet via its different operational nodes.

GBIF goals indicate that it is the intention of participants (signatories of the MoU) that GBIF (2):

- (a) be shared and distributed, while encouraging co-operation and coherence,*
- (b) be global in scale, though implemented nationally and regionally,*
- (c) be accessible by individuals anywhere in the world, offering potential benefits to all, while being funded primarily by those that have the greatest financial capabilities,*
- (d) promote standards and software tools designed to facilitate their adaptation into multiple languages, character sets and computer encodings,*
- (e) serve to disseminate technological capacity by drawing on and making widely available scientific and technical information, and*
- (f) make biodiversity data universally available, while fully acknowledging the contribution made by those gathering and furnishing these data.*

In terms of its scope (4), participants of GBIF may undertake some or all of the following activities:

- a) Improving the accessibility, completeness and interoperability of biodiversity databases, including :*
 - i) contributing data and technical resources, within and intellectual property rights framework (such as that described in paragraph 8),*
 - ii) developing novel use interface designs and incorporate features to support their functionality in a multi-lingual global context,*
 - iii) developing suitable tools and standards for accessing, linking and analysing new and existing databases, including standards and protocols for indexing, validation, documentation and quality control in multiple human languages, character sets and computer encodings; and*
 - iv) providing access to new and existing databases.*
- b) Facilitating development of an electronic catalogue of the names of known organisms,*
- c) Designing and implementing SpeciesBank,*
- d) Developing a digital library of biodiversity data,*
- e) Developing partnerships with other relevant organisations and projects,*
- f) Improving high speed networking and computation infrastructures,*
- g) Sharing computational facilities, including high volume data storage,*
- h) Developing model curricula for biodiversity informatics training,*
- i) Training researchers, data managers and technicians,*
- j) Implementing specific programs to enhance the biodiversity informatics capacity and technical skills base of developing countries, and*

k) *Helping co-ordinate and harmonise the biodiversity informatics programs of Participants.*

In summary, through reliable data and information generation and sharing, GBIF seeks to enhance conservation opportunities and possibilities.

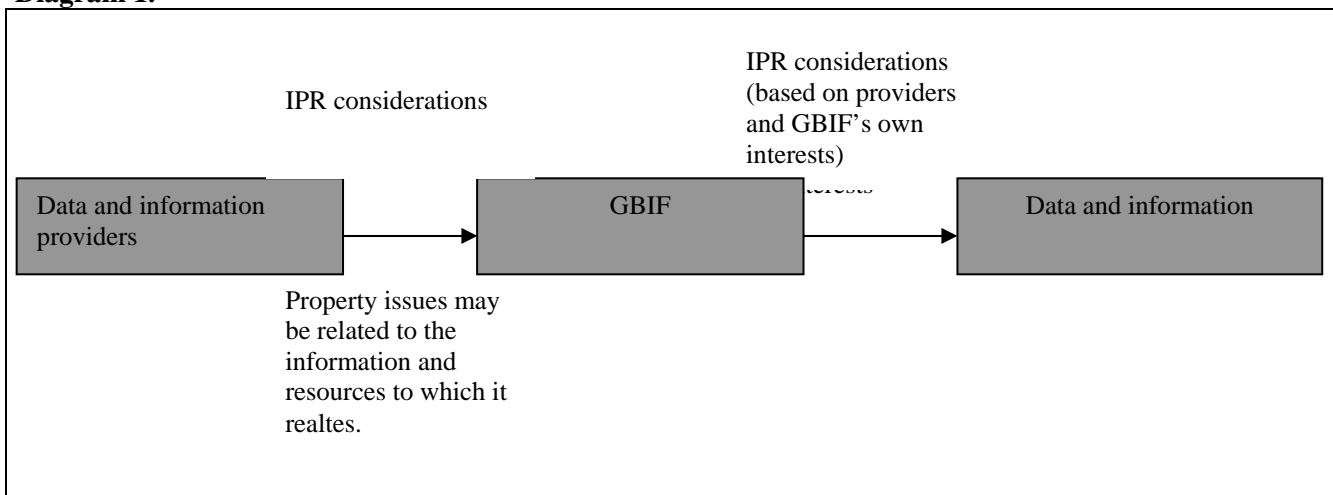
2. Institutional IPR policies of GBIF as recognised in the Memorandum of Understanding.

GBIF's expressly recognises that a "... *co-ordinated international effort is needed to enable users throughout the world to discover and put to use vast quantities of global biodiversity data...*" which is widely dispersed among different institutions. However, as has been pointed out, information nowadays (including biodiversity data such a taxonomic or specimen information) and the manner in which it is organized and presented is an invaluable asset. IPR thus may play an important role in solving externality problems which generally arise in the generation and, especially, reproduction of informational goods and services.

In the specific context of the GBIF, IPR is an important factor in terms of:

- a) rights which could be vested in data and information *provided* to GBIF (which refers directly to the organisations, institutions, nodes which provide data to GBIF),
- b) GBIF's own efforts in the *generation* of new and distinct databases and their wide *dissemination*,
- c) *limitations* imposed upon users of these databases, and
- d) possibilities of generating products (including non informational products) directly or indirectly based on the data and information obtained through GBIF.

Diagram 1.



GBIF could probably utilise IPR tools (and copyright in particular) as a means to ensure an appropriate use of its data and information - rather than as an instrument to limit access (see below) - and as a means to prevent unauthorised commercial or industrial exploitation of its databases.

Consideration of IPR options by GBIF will therefore also depend on:

- a) the source of the data and information (whether private or public),
- b) the type of information (compilations of data, organised data, comprehensive databases), and
- c) conditions imposed for the use of data and information as part of the bioinformatics database (GBIF),

IPR may be relevant to GBIF as a management tool to relate users and providers. Paragraph 8 of the GBIF MoU has developed a set of elements to safeguard itself against IPR claims and safeguard the interests of potential users of the system. It is an interesting and pro active approach to some of the main issues around the use of IPR.

Paragraph 8.

1. Applicable Law

Nothing in the MOU should be read to alter the scope and application of Intellectual Property Rights and benefit sharing agreements as determined under relevant laws, regulations and international agreements of the Participants.

The MoU seeks to ensure that the GBIF respects existing IPR laws and regulations which might be applicable to information it accesses, utilises and distributes. In as much as it does not hold or manage genetic resources *per se*, the CBD provisions on access and benefit sharing (ABS) (article 15) would not be applicable unless the information accessed is, in turn, part of (or the result of) a benefit sharing agreement and is subject to specific use restrictions (including contractual limitations or IPRs).

2. Access to Data

To the greatest extent possible, GBIF is foreseen as an open-access facility. All users whether GBIF Participants or others, ought to have equal access to data in databases affiliated with or developed by GBIF.

This is critically needed, particularly for developing countries (or institutions from them) who are not formally Participants of the GBIF. Open, unrestricted access should be – as it is - the ruling principle for GBIF.

Box 1. Some examples of database institutional policies on IPR, disclaimers, etc.

Entities	Copyright statements	Conditions of access to information	Acknowledgement of the source	Disclaimers	Restrictions
INSTITUTIONS AND PROGRAMMES					
<i>Royal Kew Botanic Gardens (UK)</i> DNA Bank Database	In each of the WebPages ©.	Subject of charge, not for DNA samples to be purchased, but to offset the cost of producing the sample and maintaining and shipping it. Every order (can be downloaded) must be accompanied by an MTA (can be downloaded).	Instructions for citing the database provided.	Regarding the quality or concentration of these samples and how these samples can be used. Also regarding conditions of the material.	
<i>Royal Kew Botanic Gardens (UK)</i> Kew Record of Taxonomic Literature	This database and its contents are © copyright (2001) of the Board of Trustees of the Royal Botanic Gardens, Kew. All rights reserved.	Copies, including those made in electronic form, may be made of the data held within this database for your own use or for use within your organisation. It may also be used in the compilation of a bibliography supplemental to work of your own preparation.	Instructions for citing the database provided.	No Responsibility for any errors or omissions in the data or any damage caused, arising from the use or interpretation of the data.	
<i>Royal Kew Botanic Gardens (UK)</i> PIC Electronic Plant Information Centre	Kew or licensors own copyright and any other IPRs. Where it is owned by a third party, certain restrictions may apply.	Subject to a catalogue of Terms and Conditions of use of the Website.	Acknowledge the source of the data by the words " <i>With the permission of the Trustees of the Royal Botanic Gardens, Kew</i> " in a position which is reasonably prominent in view of your use of the data.	The website and data is provided only on an "as is" and "as available" basis. Kew does not accept any responsibility for errors or omissions. Exclusion of warranties in respect of such data and other material (satisfactory quality, fitness for a particular purpose, non-infringement, compatibility, security or accuracy). Download software or data at your own risk (no warranties on viruses or errors).	Data should not be used for commercial purposes. Data may be used solely for scholarly, educational or research purposes. It should not be published, except in small extracts provided for illustrative purposes and duly acknowledged. Any other use of data or any other content from this website may only be made with our prior written

Entities	Copyright statements	Conditions of access to information	Acknowledgement of the source	Disclaimers	Restrictions
				<p>Exclude liability (also of its agents, employees or sub-contractors) for any loss, damage, claim, cost or expense however it may arise, whether from an inability to use this website, use of any materials on or from this website or otherwise in connection with this website.</p> <p>Does not exclude liability for damages resulting from fraud or for death or personal injury resulting from our negligence.</p> <p>In no circumstances will we, our agents, employees or sub-contractors be liable to you for any business interruption or loss of use, data, profits, contracts or goodwill or any anticipated savings.</p> <p>No responsibility for accuracy of information found on websites linked to this website.</p>	agreement.
Natural History Museum (UK)	<p>The use of the website carries with it no rights in relation to copyright, trade marks or other intellectual property rights of NHM.</p> <p>The material and content contained within or provided by the website is for personal use only and may not be used for commercial purposes, distributed commercially or</p>	<p>The user is: responsible for maintaining the confidentiality of any username and password.</p> <p>As a result, he is responsible for all activities which occur under them.</p> <p>Notify of unauthorised use of which you become aware.</p> <p>Responsible for obtaining the equipment and paying all telephone charges necessary to access and use the website. User is also responsible for</p>		<p>NHM does not accept responsibility for any defects that may exist, or for any costs, loss of profits, loss of data, or consequential losses arising from the use of, or inability to access the website.</p> <p>No warranties are given.</p>	

Entities	Copyright statements	Conditions of access to information	Acknowledgement of the source	Disclaimers	Restrictions
	<p>used for commercial purposes without permission. To request such permission, an e-mail needs to be sent, including name, address and a description of the intended use and the material or content to be used to NHM Publishing Permissions at licencing@nhm.ac.uk licencing@nhm.ac.uk.</p>	<p>making own back-up arrangements.</p>		<p>No responsibility for links to other websites or resources.</p> <p>Right to suspend, restrict, or terminate access to the website for any reason at any time.</p> <p>No responsibility for computer viruses.</p>	
<p><i>New York Botanical Garden (USA)</i></p>	<p>Text, image files, audio and video clips, and other content on this website are the property of the <i>New York Botanical Garden</i> and are protected by copyright and other restrictions.</p> <p>Copyrights and other proprietary rights in the content on this website may also be owned by individuals and entities other than, and in addition to, the <i>New York Botanical Garden</i>.</p> <p>The <i>New York Botanical Garden</i> expressly prohibits the copying or distribution of any protected materials on this website, except for the purposes of fair use as defined in federal law (research, etc.).</p>	<p>The content may only be used for personal, educational or non-commercial purposes.</p>	<p>Users must cite the author and source of the content as they would material from any printed work</p> <p>The citation must include all copyright information and other information associated with the content and the URL for the <i>New York Botanical Garden</i> website.</p> <p>None of the content may be altered or modified.</p> <p>Users must comply with all other terms or restrictions which may be applicable to the individual file, image or text.</p>	<p><i>New York Botanical Gardens</i> does not warrant that use of the text, images, and content displayed on the website will not infringe the rights of third parties.</p> <p>Content on the website is provided "as is" without a warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability, fitness for a particular use, and/or non-infringement.</p> <p>No responsibility for viruses.</p> <p>No responsibility for the contents of any linked website.</p>	<p>Unauthorized commercial publication or exploitation of text, images, or content of this website is specifically prohibited.</p> <p>Anyone wishing to use any of these files or images for commercial use, publication, or any purpose other than fair use must request and receive prior written permission</p> <p>Permission for such use is granted on a case-by-case basis at the sole discretion of the <i>New York Botanical Garden</i>. A usage fee may be assessed depending on the type and nature of the proposed use</p>
<p><i>New York Botanical Garden (USA)</i></p>		<p>The Herbarium is open to any visitor.</p>			<p>Restrictions on specimen records of Endangered and</p>

Entities	Copyright statements	Conditions of access to information	Acknowledgement of the source	Disclaimers	Restrictions
Loans of Herbarium Specimens		<p>Need to make an appointment</p> <p>Information on specimen labels is normally available to visitors without charge.</p> <p>Charge of \$30 per hour, when the requested data is extracted and provided by a member of the Herbarium staff.</p>			<p>Threatened Plant Species:</p> <p>Some of specimen data (such as specific locality information) has been removed from those online records for endangered species. These data is made available to researchers on request.</p> <p>In the process of removing portions of records for species listed in the <i>United States Federal Endangered Plant Species list and in the IUCN Red List of Threatened Plants</i>.</p> <p>Also removed information of species from groups such as Orchids, Cycads (including Zamiaceae) and Cacti, which are often subject to over-collection.</p>
Expert Center for Taxonomic Identification ETI	All data in the WBD are copyright protected by the authors, artists and other contributors and may not be copied or reproduced without approval of ETI and the lawful owners.	Free of charge for non-commercial use: scientific and educational purposes.			
DATABASES					
Munich Information Center for Protein Sequences (MIPS)	MIPS Databases and associated information are protected by copyright. This server and its	Commercial users may contact the distributor Biomax Informatics GmbH .		No liability for the use of results, data or information which have been provided	Neither the use for commercial purposes, nor the

Entities	Copyright statements	Conditions of access to information	Acknowledgement of the source	Disclaimers	Restrictions
	associated data and services are for academic, non-commercial use only			through this server.	redistribution of MIPS database files to third parties nor the distribution of parts of files or derivative products to any third parties is permitted.
NETWORKS					
<i>European Natural History Specimen Information Network ENHSIN SYS</i> Bioprospecting policy					Restrictions are necessary for a number of reasons, including protecting confidentiality of locations of rare species and the Museum's and host countries' intellectual property rights.
COMPANIES					
<i>Biomax Informatics AG Biomax Human Genome Database Online</i>	Database is copyrighted.	Licensee agreement. Academic and non-profit: \$ 500/user/year Commercial: \$1500/user/year		No liability for fitness of the database and merchantability. No liability for damages induced from the use of the database.	No disclosure of the database to third parties. No need for consent for use.
<i>Celera Genomics, USA</i>	All contents of its web site are protected by copyright and/or other intellectual property rights, and may not be modified, distributed, posted or transmitted without prior written consent. For own personal, non-commercial use only. No copyright notices, other intellectual property or legal notices or other identifying information may be removed from downloaded materials.			No liability for damages of any kind that may result from access to, or use of the information contained on the web site, including, but not limited to, any such damages arising from errors or omissions, misprints, out-of-date information, inaccuracies, typographical or other errors. No liability form viruses. No responsibility for information provided by third parties	

Entities	Copyright statements	Conditions of access to information	Acknowledgement of the source	Disclaimers	Restrictions
	For any other purpose, need of prior written consent			<p>No warranties for fitness or merchantability of information or use of the information provided</p> <p>Disclaim obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, unless required by law.</p>	

Source: SPDA, 2003.

3. *Intellectual Property Rights to Biodiversity Data*

GBIF should encourage the free dissemination of biodiversity data and, in particular:

a) should not assert any Intellectual Property Rights in the data in databases that are developed by other organisations and that subsequently become affiliated to GBIF;

This would coincide with the basic open access rule but will be limited to data and databases that are, in turn, not subject to IPR restrictions or conditions.

b) should seek, to the greatest extent possible, to place in the public domain any data commissioned, created or developed directly by GBIF; and

This is related to the main objective and goal of GBIF which is to make data and databases it creates and develops, widely available for use by Participants and external (non MoU signatories) third parties. However, this “placing in the public domain” should be linked to possible mechanisms to ensure that this information and data is not, in turn, appropriated (see discussion below on “copyleft”).

c) should respect conditions set by data providers that affiliate their databases to GBIF.

When establishing affiliations or linkages with other databases, GBIF should seek to ensure that the data so made available will, in effect, be in the public domain, and will not be subject to limitations on its further non-commercial use and dissemination, apart from due attribution.

This is again in line with the spirit of the GBIF. Restricted or conditioned data should be the exception rather than the rule when incorporating it into the GBIF. Due recognition to sources and attribution is certainly a condition which should be promoted. However, there could be situations (depending on “sophistication” of or need by partner databases and research undertaken) where certain information is subject to confidentiality (upon request of the provider) and may require special, additional procedures to be accessed.

d) Attribution

GBIF should seek to ensure that the source of data is acknowledged and should request that such attribution be maintained in any subsequent use of the data.

e) Access to Specific Data.

Nothing in this MOU should be read to restrict the right of owners of databases affiliated with GBIF to block access to any data.

As mentioned before, this should be an exception. Owners of databases affiliated or incorporated into GBIF should commit their databases (and content) to wider, non commercial uses by GBIF users. Only in exceptional and very specific circumstances should restrictions be placed to limit access to information. Non commercial use is an important distinction given commercial uses may imply a wider set of considerations regarding, for example benefit sharing opportunities.

f) Validity of Data

It should be a condition of access to and use of GBIF that users acknowledge that the validity of the data in any databases affiliated with GBIF cannot be assured. GBIF should disclaim responsibility for the accuracy and reliability of the data as well as for the suitability of its application for any particular purpose.

g) Legitimacy of Data Collection

Where the collection of new data has entailed access to biodiversity resources, GBIF should ask for reasonable assurances from the data holder that such access was consistent with applicable laws, regulations and any relevant requirements for prior informed consent.

Though difficult to provide with an accurate estimated figure, it is reasonable to suggest that a considerable portion of all data and information (new and past) in GBIF will probably have been generated on by institutions and providers having, in turn, generated information based on biodiversity components accessed - at some point in time (directly or indirectly through other institutions) – in different countries. This is especially the case of the bigger institutions and colonial past of their host countries.

One of the CBD objectives and its core principles (articles 1, 15) in this regard refer to the need for benefit sharing from access to and use of genetic resources; prior informed consent from the country of origin – when access is sought; reaching mutually agreed terms (between the provider – i.e. country of origin) and the applicant for these resources. Of particular relevance, especially in the case of *new* data and information, is whether or not data and information are based on legally obtained biodiversity components and what might the legal *status* of that information be.

However, this should not overshadow the fact that, according to some consulted expert, most data entering the GBIF will probably refer to documenting local flora and fauna by local researchers, through local surveys, vouchers from monitoring work and observational data from naturalists and researchers.

In the context of genomics (and the possibility of using genetic, protein, molecular, etc. information *per se* as a means to generate products), political correctness and from a purely ethical perspective, best efforts need to be made to ensure that CBD rules are complied with. If GBIF could play a role – even if minor - in institutionalising best practices and promoting this approach, the effects on other institutions could be considerable.

h) Intellectual Property Rights to Biodiversity Tools

GBIF may claim appropriate Intellectual Property Rights available within applicable national jurisdictions over any tools, such as search engines or other software products, that are developed by GBIF while carrying out the GBIF Work Programme.

In the spirit of GBIF as an open source service/ product, software, search engines or other tools, should be made widely available without restrictions. In this regard, legal protection of these tools (i.e. through copyright) should be conditioned to free availability, copying, modification and distribution as proposed by the copyleft regime. Protection should not be based on ensuring exclusive rights and control, but rather, on promoting further free use, creation and innovations.

i) Technology Transfer

The Participants acknowledge that, subject to any relevant Intellectual Property Rights, GBIF should seek to promote the non-exclusive transfer to research institutions in developing countries of such informatics technology as it has available, especially in conjunction with training and capacity development programs.

Training in management of these technologies will prepare individuals and institutions to best utilise available technologies and adapt them to serve national needs.

One important issue which is not clearly reflected in this section of the MoU is what if, at some point in time, data and information are used by third parties for direct or indirect commercial or industrial applications (to generate a product). This may not be a widely relevant issue as yet in the context of species and specimen related information but, as GBIF develops and evolves and other data and information become part of its content, the issue could be very relevant in terms of IPR related questions.

One clear principle which would need to be operationalised is to recognise that in these cases, benefits should be shared a) maybe with GBIF itself in terms of results of research and development processes), and / or b) maybe with the country (ies) of origin upon whose biodiversity, the data and information was a factor in the process of research and development. This will depend on practical monitoring possibilities.

The idea of developing a “technology transfer or training fund” to support these activities (courses, student exchange, purchasing equipment, etc.) in countries of origin could be an option by which these benefits might accrue more practically to both GBIF and countries of origin.

3. Some key concepts: public domain; databases and copyright, copyleft and technology restrictions.

Box 2. An initial introduction to copyright.

Why is copyright important? Today, communications and IT – especially in the context of the Internet – and the manner in which intellectual creations are produced, stored and disseminated have had an important influence on copyright as an effective and efficient mechanism to protect them. As has been widely recognised the “... *creation and ownership of knowledge products are of increasing importance because of the centrality of information and knowledge to post industrial economies. The concept of copyright, originally intended to protect authors and publishers of books, has broadened to include other knowledge products such as computer programs and films ... Copyright has emerged as one of the most important means of regulating the flow of ideas and knowledge based products, and will be a central instrument for the knowledge industries of the twenty first century. Those who control copyright have a significant advantage in the emerging, knowledge based global economy. The fact is that copyright ownership is largely in the hands of the major industrialized nations and of the major multimedia corporations placing low per capita income countries as well as smaller economies at a significant disadvantage*” (UNESCO, 1998).

A brief definition. Copyright is a special, intangible property right. It grants a right to the creators of original literary, scientific and artistic works. Copyright does not require formalities (it is an automatic right) and is generated with the actual creation of the work and lasts (as a general rule) for the life of the creator plus, generally, 50 years (70 years in the US and varies within the EU, though 50 years

is the minimum set by the Berne Convention). It prevents unauthorised reproduction, public performance, recording, broadcasting, translation or adaptation of the protected work and allows the collection of royalties for authorised use.

Can databases be protected by copyright? Databases may be protected in Europe and the US (and elsewhere) through copyright due to the selection and arrangement of their content. If the data and material are arranged in such a way that items are individually accessible, they may be protected by copyright. Copyright protection will imply the database must be *original* in the selection or arrangement of the contents. Originality in a database will be met if, by reason of the selection or arrangement of the data and information, the database expresses the authors (creators) own intellectual creation.

What is a database or sui generis right? This is a right which applies to non original databases which show there has been a qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of their contents. It applies to databases that do not reach the originality criteria and thus may not be protectable under copyright. The EU Directive offers both types of protection. The US protects databases through the Copyright Act (and the NAFTA Agreement), though there are initiatives such as the *Database and Collections of Information Misappropriation Act (H.R 3621, 2003)* and the *Collections of Information Antipiracy Act (H.R 354, 1997)* which seek to offer protection based on misappropriation and de EU Directive *sui generis* approach.

Beneficiaries of the sui generis right and reciprocity. The *sui generis* right in the EU applies to database whose makers or right holders are nationals of the EU or have habitual residence in the EU. It also applies to companies and firms formed in accordance to Member States law and having their central office and administration within the EU. If it only has a registered office, its operations must be linked on an ongoing basis with the economy of a Member State. In the case of countries which are not covered under the above, the European Council will conclude individual agreements (proposed by the Commission).

Are elements or the content of the database protectable? Many databases are collections of copyright works. When compiling or creating a database, due consideration needs to be given to this copyright and, in many cases, permission will need to be obtained from the owners of copyright (or database or *sui generis* right). When a database is delivered on line there will often be a contractual agreement between the database owner and the user, setting out what use is permitted.

What are the “fair dealing” (or “fair use” doctrine in the US) exceptions to copyright? Some copyright exceptions are limited by “fair dealing”. The recognition for a balance between the exclusive rights of authors and creators and the social goal of disseminating knowledge has made international copyright law place limits - under certain circumstances- on the right to prevent unauthorised use of protected creations. The Berne Convention for example determines that countries may allow for the reproduction of certain works in certain cases, provided that such reproduction does not conflict with normal exploitation of the work or cause unreasonable damage to the interests of the copyright owner. National legislation in regions and countries incorporate to a varying degree and level exceptions for copying for personal use, education, research, library use, news reporting, etc. and provided no commercial or industrial use is implied. IT has had and is having considerable impact on the possibilities of copying materials and thus, this same technology is adopting technological restrictions (encryption or circumvention measures) which, in turn, could have an impact on the fair dealing exception and reduce options for accessing data and information.

Source: most of the information in this box has been obtained or adapted from <http://www.intellectual-property.gov.uk/std/faq/copyright/databases.htm>

Copyright and public domain. Copyright involves moral, personal rights *and* an exclusive, economic right which gives the creator the right to authorise the use of his creation and obtain a benefit. Moral rights are recognised in Europe and most legislation. The economic right is limited in time by law. Within the period of protection, the author (or creator) can receive an economic income for the use of his work. Within this period, the creation is said to be in the “private domain” in the sense that, in general, any use – whether for profit or non- for profit – of the work will need to be authorised. For an author, this period extends to 50 years after his death (minimum protection awarded by the Berne Convention). The period varies in the case of legal persons, legally entitled to the copyright. Once the protection period has been extinguished, the creation enters into the “public domain” and its use is free. However, moral rights (recognition of the paternity or “authorship” of the creation and the integrity of the work) are valid indefinitely. Although in principle, public domain works are freely available, some countries (i.e. Argentina, Bolivia, Uruguay) have considered the “public domain payant” concept as a means to seek a monetary benefit – from works in the public domain - which is then administered by a national institution responsible for the promotion of the arts and culture. The “public domain payant” is not copyright or “*droit d’auteur*” *per se* – no authorisation is required – but, rather, a fiscal contribution or a tax imposed on certain activities.

Whether covered or not by copyright (or a *sui generis* right), putting data and information in the public domain (within reach and accessibility of a wide number of non identifiable users) may be subject to a range of conditions and restrictions of use. However, enforcing these conditions and restrictions – especially in third countries - poses considerable challenges, especially in the era of the Internet. Generally, institutions (i.e. botanic gardens) tend to put their scientific data and information (i.e. taxonomic information) in the public domain for purposes of continued and unimpaired research.

Box 3. Framework international instruments addressing copyright protection applicable to databases.

Berne Convention for the Protection of Literary and Artistic Works (1886 – latest Paris Act 1971) ; “*Collections of literary and artistic works such as encyclopaedias and anthologies which, by reason of the selection and arrangements in their contents, constitute intellectual creations shall be protected as such, without prejudice to the copyright in each of the works forming part of such collections*” (article 2(5)). General consensus has emerged in recent years that collections of materials other than literary and artistic works are subject to copyright protection under Berne (provided they qualify as “works”, thus, are original).

Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs) of the World Trade Organisation (1995) ; “*Compilations of data or other material, whether in the machine readable or other form, which by reason of the selection or arrangement of their content constitute intellectual creations shall be protected as such. Such protection, which shall not extend to the data or material itself, shall be without prejudice to any copyright subsisting in the data or material itself*” (article 10(2)).

World Intellectual Property Organization Copyright Treaty (2002) ; “*Copyright protection extends to expressions and not to ideas, procedures, methods of operation or mathematical concepts as such*” (article 2); “*Compilations of data or other material, in any form, which by reason of the selection or arrangement of their content constitute intellectual creations, are protected as such. This protection does not extend to the data itself and is without prejudice to any copyright subsisting in the data or material contained in the compilation*” (article 5).

Databases and their protection. A database is a collection of works, information, data or other materials which have been arranged in a systematic manner and can be accessed individually by electronic or other means. Works stored may be protected by copyright in themselves. Generally, a database – whether in an electronic form or not - will combine a set of copyright protected works and non - protected works or data. The copyright in the database is independent from specific copyright in each of the works included in it. Data and information should be available individually. Random, unorganised data and information will not necessarily create a database. In the case of electronic databases, an interesting point is that, although information and data are usually “fed” in a random way, the computer software program – an integral and essential component of the database - then organises the data at an immediate, automatic, but later stage. The software provides with the tool for the systematic organisation of the information. This technical feature does not alter the fact that a database is thereby verified. It should be noted that the software *per se*, may also be subject to legal protection through patents or copyright. Although essentially linked, the computer program or software and the database itself are distinct elements and may be subject to differentiated legal regimes.

The *sui generis* or database right created by the European Directive (see Box 4), as a reaction to European database markets being dominated by US firms, protects non original databases (databases that can't be protected through copyright). This new right was basically created to protect especially vulnerable electronic, on line databases which have required considerable investments for their making. The maker of the database is the person who takes the initiative in obtaining, verifying or presenting the contents of the database and

assumes the risk of investing in this effort. The owner of the *sui generis* right can object to the extraction and re-utilisation of all or a substantial part of the contents of the database. The right in the investment will also cover the use of its contents. Critics argue that *sui generis* protection of databases could seriously undermine accessibility to scientific and technical information and thus, impact further progress in science and technological developments (American Association of Information Technology, 2001).

Box 4. A comparative chart on the legal protection of databases.

<i>Instrument/issue</i>	<i>European Directive 96/9/EC of the European Parliament and of the Council of March 11, 1996 on the Legal Protection of Databases</i>	<i>Protection in the US</i> Note: Based on TRIPs, Berne and NAFTA (and the Copyright Act), copyright criteria (originality) has been applied to database protection. Proposals under consideration include:		<i>WIPO Copyright Treaty</i>	<i>WIPO Basic Proposal for the Substantive Provisions of the Treaty on IPR in Respect of Databases (1996)</i> Prepared by the Chairman of the Committee of Experts on a Possible Protocol to the Berne Convention and on a Possible Instrument for the Protection of Rights of Performers and Producers of Phonograms CRNR/DC/6 1996).
		<i>Collection of Information Antipiracy Act (H.R 354, 1999)</i>	<i>Database and Collections of Information Misappropriation Act (H.R 3621, 2003)</i>		
<i>Scope</i>	All databases regardless of their form (article 1).	Collections of information.	Misappropriation of databases.	Compilation of data or other material, in any form, which by reason of the selection or the arrangement of their contents constitute intellectual creations (article 5). Scope of protection for compilations of data is consistent with relevant provisions of the Berne Convention and the TRIPs Agreement.	Databases that represent a substantial investment in their collection, assembly, verification, organization or presentation of their contents (article 1(1), regardless of the form or medium in which they are embodied or whether or not they are made public (article 1(2)).
<i>Definition of a database</i>	Collection of independent works, data or other material arranged in a systematic or methodical way and individually accessible by electronic or other means (article 1).	Collection of information which has been collected and organised for the purpose of bringing discrete items of information together in one place or through one source so a person may access them. Information: facts, data, works or any	Collection of a large number of discrete items of information produced for the purpose of bringing such discrete items together in one place or through one source so that persons may access them.		Collection of independent works, data or other materials arranged in a systematic or methodical way and capable of being individually accessed by electronic or other means (article 2).

Instrument/issue	European Directive 96/9/EC of the European Parliament and of the Council of March 11, 1996 on the Legal Protection of Databases	Protection in the US		WIPO Copyright Treaty	WIPO Basic Proposal for the Substantive Provisions of the Treaty on IPR in Respect of Databases (1996)
		<p>Note: Based on TRIPs, Berne and NAFTA (and the Copyright Act), copyright criteria (originality) has been applied to database protection.</p> <p>Proposals under consideration include:</p>			
		Collection of Information Antipiracy Act (H.R 354, 1999)	Database and Collections of Information Misappropriation Act (H.R 3621, 2003)		Prepared by the Chairman of the Committee of Experts on a Possible Protocol to the Berne Convention and on a Possible Instrument for the Protection of Rights of Performers and Producers of Phonograms CRNR/DC/6 1996).
		other intangible material which can be systematically organised. (Section 1401)			
Subject matter	Databases (<i>original</i> – through copyright - and <i>non original</i> – through a <i>sui generis</i> right).	Collections of information.	Large collections of discrete items of information.	Compilations of data (databases) (article 5).	
Limitations in scope	The Directive applies without prejudice of Community rules on: a) legal protection of computer programs, b) rental, lending and certain copyright and related rights (article 2)	Government collections of information, computer programs (nor incorporated collections of information) , digital online communications (Section 1404).	Government information, computer programs (which serve to operationalise the functions of the database and incorporated databases – part of the computer program). (Section 5)		Protection does not extend to computer programs (which facilitate operation of the database) (article 1).
Rights conferred	Copyright (article 3) for certain types of databases (based on the authors intellectual creation and based on the originality criteria) and a <i>sui generis</i> right (article 7) for the maker of a database which shows there has been qualitatively/quantitatively a substantial investment in either the obtaining, verification or	Any person who makes available to others, or extracts to make available to others, all or a substantial part of a collection of information gathered, organised or maintained by	Any person who makes available in commerce to others a quantitatively substantial part of the information in a database, without the authorisation the owner of the database or his		The maker of the database will have the right to prohibit the extraction or utilisation of its contents (article 3). National legislation may indicate that the right of utilisation (above) does not apply to distribution of original or copies of databases which have been sold or the

Instrument/issue	European Directive 96/9/EC of the European Parliament and of the Council of March 11, 1996 on the Legal Protection of Databases	Protection in the US Note: Based on TRIPs, Berne and NAFTA (and the Copyright Act), copyright criteria (originality) has been applied to database protection. Proposals under consideration include: <i>Collection of Information Antipiracy Act (H.R 354, 1999)</i> <i>Database and Collections of Information Misappropriation Act (H.R 3621, 2003)</i>		WIPO Copyright Treaty	WIPO Basic Proposal for the Substantive Provisions of the Treaty on IPR in Respect of Databases (1996) Prepared by the Chairman of the Committee of Experts on a Possible Protocol to the Berne Convention and on a Possible Instrument for the Protection of Rights of Performers and Producers of Phonograms CRNR/DC/6 1996).
	<p>presentation of the content (article 7).</p> <p>In terms of its copyright protection, the author of the database will have the exclusive right to carry out or authorise: permanent or temporary reproduction; translation, adaptation, arrangement or alteration; distribution; communication; reproduction, distribution, communication and display of the above (article 5).</p> <p>The <i>sui generis</i> right protects the maker against unauthorised extraction and re utilisation of the database content (article 7, a, b).</p>	<p>another person through the investment of substantial monetary or other resources, so as to cause harm to the primary market or a related market of that other person, for a product or service that incorporates that collection and is offered or intended to be offered in commerce, shall be liable to that person in interest for remedies such as civil actions, injunctions, impoundment, monetary relief.</p> <p>(Section 1406).</p>	<p>licensee, shall be liable to monetary relief, damages impoundment if: the database was created and maintained through a substantial investments or time; unauthorised making available in commerce inflicts injury on the database. (Section 3)</p>		<p>ownership of which has been transferred in that Party (pursuant to an authorisation) (article 3).</p>
Right holders	<p>Author of the database (in the case of copyright) and the maker of the database (in the case of the <i>sui generis</i> right) (articles 3 and 7).</p>				<p>Rights are owned by database makers and are freely transferable (article 4).</p>
Transmission of rights	<p>Rights of the maker can be</p>				<p>See above.</p>

<i>Instrument/issue</i>	<i>European Directive 96/9/EC of the European Parliament and of the Council of March 11, 1996 on the Legal Protection of Databases</i>	<i>Protection in the US</i> Note: Based on TRIPs, Berne and NAFTA (and the Copyright Act), copyright criteria (originality) has been applied to database protection. Proposals under consideration include: <i>Collection of Information Antipiracy Act (H.R 354, 1999)</i> <i>Database and Collections of Information Misappropriation Act (H.R 3621, 2003)</i>		<i>WIPO Copyright Treaty</i>	<i>WIPO Basic Proposal for the Substantive Provisions of the Treaty on IPR in Respect of Databases (1996)</i> Prepared by the Chairman of the Committee of Experts on a Possible Protocol to the Berne Convention and on a Possible Instrument for the Protection of Rights of Performers and Producers of Phonograms CRNR/DC/6 1996).
	transferred through a licence (article 7(3)).				
<i>Exceptions to rights</i>	To copyright: reproduction for private purpose of a non electronic database; use of illustrations for teaching or scientific research (identifying the source); public security; other copyright exceptions (article 6). To <i>sui generis</i> right: lawful users may extract or re utilise its content: (in the case of non electronic databases) for private purposes; for teaching and scientific research (with indication of source); public security or an administrative procedure (article 9).	Reasonable uses: illustration, explanation, example, comment, research, teaching, analysis. Criteria: non profit, amount, good faith, effect on market. Protection does not extend to data and information contained in the collection (Section 1405).	The Act shall not restrict a person from independently generating or gathering information by obtaining it by means other than extracting it from a database generated, gathered or maintained. Making available in commerce of substantial part of database by non for profit educational, scientific or research institution (when this making available is "reasonable" under the circumstances); hyper linking, news reporting.	Protection does not extend to the data or material itself and is without prejudice to any copyright subsisting in the data and material contained in the compilation (article 5).	Parties may establish exceptions or limitations to the rights of the holder in special cases that do not conflict with normal exploitation of the databases and do not affect interests of the right holder (article 5(1)). Parties may also determine protection to databases produced by governmental entities or their agents and employees (article 5(2)).

Instrument/issue	European Directive 96/9/EC of the European Parliament and of the Council of March 11, 1996 on the Legal Protection of Databases	Protection in the US		WIPO Copyright Treaty	WIPO Basic Proposal for the Substantive Provisions of the Treaty on IPR in Respect of Databases (1996)
		<p>Note: Based on TRIPs, Berne and NAFTA (and the Copyright Act), copyright criteria (originality) has been applied to database protection.</p> <p>Proposals under consideration include:</p>			
		Collection of Information Antipiracy Act (H.R 354, 1999)	Database and Collections of Information Misappropriation Act (H.R 3621, 2003)		Prepared by the Chairman of the Committee of Experts on a Possible Protocol to the Berne Convention and on a Possible Instrument for the Protection of Rights of Performers and Producers of Phonograms CRNR/DC/6 1996).
			(Section 4)		
Protection period	<p>15 years from the first of January immediately after the date of completion (<i>sui generis</i> right). 15 years from the time the database is made public (article 10).</p> <p>Any substantial change, alteration or modification to the database, evaluated quantitatively or qualitatively, which result in a database being considered a substantial new investment shall qualify for its own database protection (article 10).</p>				<p>25 or 15 years from the first day of January following the date the databases met requirements under article 1(1).</p> <p>25 or 15 years years from the first day of January following the date the databases was made available to the public.</p> <p>(article 8)</p>
Safeguards for copyright	Recognition of copyright (or any other right or restriction) vested in information and data incorporated into the database (article 13).				Recognition of copyright or other rights vested in contents of the database (article 1(3)).
Autonomy	Any contractual provision contrary to exceptions provided, will be null and void (article 150).				
Technical protection measures	Not specified.				
Application to existing databases	Applicable to databases finalised 15 years before January 1, 1998 and which are eligible for protection (article 14).				

Instrument/issue	European Directive 96/9/EC of the European Parliament and of the Council of March 11, 1996 on the Legal Protection of Databases	Protection in the US Note: Based on TRIPs, Berne and NAFTA (and the Copyright Act), copyright criteria (originality) has been applied to database protection. Proposals under consideration include:		WIPO Copyright Treaty	WIPO Basic Proposal for the Substantive Provisions of the Treaty on IPR in Respect of Databases (1996) Prepared by the Chairman of the Committee of Experts on a Possible Protocol to the Berne Convention and on a Possible Instrument for the Protection of Rights of Performers and Producers of Phonograms CRNR/DC/6 1996).
Criteria for protection	Protection only applicable to nationals of the European Union. A special regime will be determined by proposal from the Commission in the case of databases made in third countries, extending the right awarded through article 7 (article 11).	Collection of Information Antipiracy Act (H.R 354, 1999)	Database and Collections of Information Misappropriation Act (H.R 3621, 2003) No State statute, rule or regulation that prohibits or otherwise regulates conducts that are subject to the Act shall be effective. This will apply to cases involving commercial competition (not apply to pre-empt actions under State law against a person for taking action that : disrupts sources of data supply, impair accuracy)		National treatment is recognised (article 7).
Procedures	Not specified. However, the burden of proof lies on the maker of the database regarding date of completion of his database.				Not specified.

Technological restrictions. At one moment in time, the potential impacts of patents on availability and possibilities of continued research over biological inventions was – and probably still is - one of the most contentious issues in the international development (and environmental) agenda. Then came the “Terminator Technology” (*Control of plant gene expression*, US Patent 5723765) and shifted concerns to how technology itself could develop from within much more effective mechanisms to secure control and exclusivity over innovations (in this particular over plant reproduction). In the context of IT and data and information available through the Internet, digital rights management systems (including encryption technologies) offer providers of data and information (especially private sector providers) with the possibility of practically and very effectively limiting possibilities of accessing and using this data.

As has been pointed out, this “... form of technological protection rescinds traditional “fair use” rights to browse, share or make private copies of copyrighted works in digital formats, since works may not be accessible without payment, even for legitimate uses. For developing countries, where Internet connectivity is limited and subscriptions to on line resources unaffordable, it may exclude access to these materials altogether and impose a heavy burden that will delay the participation of those countries in the global information society”(Commission on Intellectual Property Rights, 2003). Although maybe not relevant as an option in the context of the GBIF (which seeks to disseminate and facilitate access), due consideration should be given to the issue of restriction technologies in the context of potential partner providers who may have – or may want to utilise – these technologies to exercise specific management or control rights over certain types of data and information.

Passwords, codes. Utilising passwords or codes to access and use certain levels of data and information are one way through which access may be restricted or, rather, controlled. Passwords and codes enable only listed or registered individuals or institutions to make use of the data and information and may even serve (depending on the level of information and background required from an applicant) to facilitate GBIF’s process of tracking institutional and individual interests in determined sets of data and information.

Copyleft: a way forward? Whilst traditional copyright seeks to give an author or creator of a work, exclusive rights to copy, modify and distribute the work (or licence these rights), copyleft has emerged as a means to wilfully revoke the exclusivity of these rights under certain terms and conditions, so that anyone can copy and distribute the work or properly attributed derivative works, while all copies remain under the same terms and conditions of the original (Stutz, 2001). It is basically a specific type of licence.

In the context of software and program development, some describe it as a general method for making a program free software and requiring all modified and extended versions of the program to be free as well (Free Software Foundation, 2002). In this case, although the simplest way to make a program free for use is to put it in the public domain (and uncopyrighted), the temptation for software developers will be to maybe make some minor or substantial changes to it and distribute the result as a proprietary product. People who receive the new program will not have the freedom the original creator intended them to have.

Under a copyleft regime, all users will have the freedom to modify and adapt the program freely, upon the condition that their resulting development is also made freely available for use (and further adaptation). This is the principle under which Linux operating system was developed. Some call these products “open source products” or “open source software”. To copyleft a program, copyright should be stated and distribution terms should indicate that all users have the right to use, modify and redistribute a programs code or program derived from it but *only* if distribution terms are unchanged. The Free Software Foundation and others have developed standard model licences (i.e. General Public Licence or a Design Science Licence) which determine specific conditions and terms to operationalise copyleft regimes (see Annexes). Copyleft is a creative reaction to the excessive powers being concentrated in software producers and the limitations to the advancement of technology (and science in general) these powers are generating.

4. Sensitive and confidential data and information: access and release issues and institutional policies.

Institutional policies. As a result of the CDB, and its ABS and technology transfer and cooperation provisions, some of the world’s most important *ex situ* conservation and research institutions – where the most valuable biological collections are housed - have adopted specific institutional policies regarding access to and use of their collections and electronic biodiversity data and information (See Annexes).

But this is true also for many other institutions who, in the context of a changing and shifting paradigm (see Introduction) are seeking to adapt their regular practices to new, often complicated, equity rules and principles.

Confidentiality. Sometimes institutions manage and work with information which is particularly sensitive to providers of that information or has been subject to restrictions regarding its wider dissemination. As a result, certain categories of information will not be made available to the general public. As mentioned earlier, the question is whether or not GBIF should include data and information which – exceptionally – may be subject

to certain access restrictions requested by providers. Certain type of information could be subject to additional levels of restriction and this could be accessed according to pre determined codes and passwords.

Box 5. The Biozulua Database case in Venezuela: an example of potential problems/issues raised in regards to databases.

The BioZulua database was created by the *Fundación para el Desarrollo de las Ciencias Físicas, Matemáticas y Naturales* (FUDECI) and the *Ministerio de Ciencia y Tecnología* in Caracas, Venezuela in XXX. It is an academic and scientific electronic database housed in the *Academia Nacional de Ciencias* (National Academy of Science). The database (not available at this time on the Internet) includes information and data on traditional indigenous medicine and traditional technologies pertaining to agriculture, nutrition, conservation practices, etc. Searches can be undertaken according to species, geographic location, ethnic groups or specific ailments. The database includes video footage of shamans collecting and preparing medicinal plants and treatments as well as images of how patients respond to treatments. It provides with genetic profiles of every plant entry and global positioning system coordinates of plant locations. Information also includes: taxonomic data of collected species, including indigenous and creole names and nomenclature, phenotypic features of samples and their traditional use. Database entries are complemented with geographical references, bibliographies and digital images.

Biozulua seeks to preserve traditional knowledge and assist in the process of bioprospecting for medicinal plants for the development of new drugs and pharmaceutical products. The Biozulua database cannot assign rights over traditional knowledge in favor of communities. Concerns have been raised by indigenous communities who fear their traditional knowledge (and resources) are being displayed and widely disseminated. FUDECI officials have assured communities information which is not in the public domain will be kept confidential until and when a system for the positive protection of traditional knowledge is developed and enters into force. Many controversial issues are still unresolved with regards to Biozulua. These include : whether prior informed consent (PIC) was sought from communities when data and information (and traditional knowledge) were being collected (in accordance with CBD principles and the Biodiversity Law of Venezuela, Law 5468 of 2000); whether the copyright granted to FUDECI (representing the State) “for the protection of the database” has implications in regards to the traditional knowledge (data and information) which are part of the database (the Government has reassured indigenous groups that the database is the subject of protection and this does not extend to its content) - indigenous groups are not fully convinced about this explanation and have stated the need for the database to be managed by communities themselves.

The Biozulua experience would appear to suggest a possibility that the database may take on the characteristics of a “database trust” where the State controls and manages it for the benefit of indigenous peoples. If this was the case, it will be interesting to verify the extent of indigenous peoples involvement in designing the institutional policy for the operations of the database and their effective decision making powers and standing.

This specific example, simply demonstrates the type of problems which may arise, particularly in cases where indigenous peoples traditional knowledge (data and information related to biodiversity) becomes part and content of a database which, in this case, clearly seeks to support basic and applied research.

Source: PowerPoint presentation by Ramiro Royero (FUDECI) titled: *BioZulua: Value Added to Traditional Knowledge* (BioZulua, Multimedia DB, Version 5), in Caracas, Venezuela, September 2002.

5. Critical considerations when accessing data and information and releasing it (through GBIF).

Release of information. As part of its institutional operating policies, GBIF formally recognises the sources of the information it provides. GBIF should also develop a set of minimum conditions to which all providers should agree if they want to make their data available (Letter of Agreement).

Property over electronic images and photographs. Copyright faces considerable challenges in the area of electronic and digital images. Legal doctrine has made a distinction between “photographic works” protected by copyright and “mere photography” or images protected mainly by neighboring rights. This dual regime is recognised in different European laws (i.e. Germany, Spain, Austria) and appropriately highlights the difference and contrast – sometimes difficult to pin point - between the artistic creativeness in certain photography and most “mass produced” photos.

Disclaimers. Web page operators – including scientific research institutions such as botanical gardens, gene banks, etc. - regularly present very detailed declarations to exempt them from responsibilities and legal liability when information and data they provide is inexact or may cause harm or injury to users of that data and information. Sometimes, operators use disclaimers to indicate that trademarks or social denominations of companies may be useful to and informative for consumers and not as means to generate publicity to them. Disclaimers seek a preventive protection against allegations regarding false information, utilisation of links to illegal web sites or materials, etc.

Box 6. Three types of disclaimers in the web site of the National Agricultural Library of the United States Department of Agriculture.

Document Content Liability.

For documents available from this server, the US Government does not warrant or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed.

Commercial Endorsement Disclaimer.

The use of trade, firm, or corporation names in this publication (or page) is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the *United States Department of Agriculture* or the *Agricultural Research Service* of any product or service to the exclusion of others that may be suitable.

NAL Mailing List Disclaimer.

The National Agricultural Library hosts e-mail based discussion groups to facilitate information exchange. The views, opinions and validity of information expressed are solely the responsibility of the original sender. The use of trade, firm or corporation names and the data provided are for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the United States Department of Agriculture or the National Agricultural Library of any product, service or information to the exclusion of others that may be suitable.

Source : <http://www.ars.usda.gov/comm.html>

Different web pages use different variations of these disclaimers. The argument for the use of disclaimers to exonerate from responsibility and liability is that, in many cases, the contents of the web page (or database) may originate from a third party with which there is no formal relation and whose reliability cannot be guaranteed.. However, a copyright holder (whose information is held in a provider database) will always have the opportunity to initiate a legal action against *any* third party -even an information provider like GBIF - which might be in violation of his rights. A disclaimer will not prevent this type of action. Two types of solutions can be found in legal doctrine for this type of situation. Under the *1998 Digital Millennium Copyright Act* of the US (which modifies the Copyright Act) a system of *vertical* exoneration for different service providers is in place.

In contrast, under the European Directive 2000/31 on electronic commerce, a *horizontal* system of exoneration is offered to access and service providers. Under this system, there is no legal responsibility or liability on the part of the service provider (i.e. GBIF) to control the legality of the information and data it provides unless the provider knew about the illicit nature of the information and does not notify and retire this information. In terms of where can a lawsuit be eventually initiated against a service provider, this is governed by Private International Law rules. These include: where are relevant effects generated; where the service provider is physically located and/or where can access to illicit content be verified.

6. How are users affected and are they legally liable for misuse of data and information?

Users of data and information may be affected from misuse of this data if copyright is infringed or if the conditions under which information was provided are not met. The Internet has made compliance and enforcement particularly complicated.

Factors such as the location of service providers or the central distribution node (i.e. GBIF) may have a bearing on applicable law and possibilities to enforce legal rights, obligations or any other commitment. Liability then becomes an important issue. Even enforcing complex contracts –if it were the case – can become exceedingly complicated.

Box 7. Possible elements in model “copyright and disclaimer notices”.

The following elements may serve to orient GBIF’s institutional policies regarding use of and rights over data and information.

- Copyright © XXX [years] by XXX [institution]. All rights reserved. All media are for non profit, educational and personal use by students, researchers and the general public. Any commercial use or publication by printed or electronic media is strictly prohibited without the express, written permission of XXX [institution]. Contact XXX [institution].

Comment: *In some cases, where data and information are collected, processed and organised in a particular manner, institutions may want to exercise copyright.*

- The XXX [institution] makes no representations or warranties regarding the conditions or functionality of this web page or the data and information in this database, its suitability for use or that it will be uninterrupted and is error free. Xxx [institution] further makes no representation about the suitability of any software used on this server or information made accessible by that software for any purpose.
- The data available through the XXX [institution] network is provided by a broad network of data providers from around the world. These data providers have striven to provide accurate data and information. However, databases are provided “as is” without express or implied warranty of merchantability and fitness for any specific purpose or use. The user accepts full responsibility.
- XXX [institution] will not be liable for any damage suffered by users of the database [or software], programming and other documentation found on these web pages and databases. XXX [institution] further disclaims any liability for any information, documentation, programs, software or any other materials which is or may become part of this web page.
- The user is thereby put on notice that by accessing and using these web pages or these databases the user assumes the risk that information and documentation contained therein may be inaccurate or incomplete and may not meet the needs and specific requirements of the user. The entire risk as to the use of these web pages or this database is assumed by the user.
- By using these web pages or these databases or copying any pages or data found on or via these web pages or databases, the user agrees to abide by XXX [institution or providers] copyright law and all other applicable laws, as well as the terms of [this] copyright and disclaimer notice. The XXX [institution] will have the right to terminate the users privilege of use immediately by written notice upon the users breach of or non compliance with the foregoing. Users may be held legally accountable for any copyright infringement that is caused or encouraged by the users failure to abide by the terms set in this notice.

Comment: *This may be relevant in the case copyright is in place or invoked.*

- XXX [institution] will provide data providers with information regarding users of the data and information. The user of the data and information agrees to identify and expressly refer to the source of the data [providing institution and/or specific data provider] in any publication or subsequent use.

Agreements for the use of data and information.

Commercial uses of data and information. This includes a) commercial use – copy, modification, distribution) of the database itself or portions of it (which will be possibly covered by copyright – or copyleft) and b) commercial, industrial and technological application of the data and information contained in or provided by GBIF. All data and information could be potentially valuable as a lead to industrial products. Whereas a) could be covered by the copyright – copyleft regime, b) could be seen as an almost natural progression in the scientific and technological process. Controlling or regulating b) would be extremely complicated in practice and maybe even undesirable. However, attention should be paid to the need to ensure that benefits generated are justly and equitably shared with GBIF and/or countries of origin (to which the biodiversity information and data ultimately relate). In this circumstance, a letter of agreement by the user of the database – committing to benefit sharing -should incorporate specific provisions for these possible circumstances.

Box 8. Some final relevant questions.

What are the rights of someone making pictures of or digitising a third party collection?

If a person is making pictures or digitising a collection of photographs of a third party, he / she may be infringing copyright if the uses of these copies are not under the general exceptions for copyright. Infringement will depend on the use to be given to these pictures (or digital images).

If data is being widely copied and distributed around the world, how can owners rights are identified?

This situation would most probably come under copyright infringement. Legal actions (to restrict, terminate these copies and distribution and even claim for damages) may be initiated according to international and national legislation. Source of copies and dissemination may need to be identified, particularly if electronic means are being utilised.

Are names copyrighted?

Names are not copyrighted. Names could be – provided they meet a distinctiveness requirement – protected as Trademark as if they served as brands for example. However, in principle, generic names or names used to identify a determined species may not be protected. Taxonomic names would not be protectable either by copyright nor by trademark

Towards an international code of conduct for data and information providers? International standards, through a code of conduct specifically designed for scientific institutions that are in the business of generating data and information and disseminating it or making it available, may be a way of promoting equity in the flow and sharing of biodiversity data and information. Whilst clearly, institutions differ widely on their role and goals (i.e. a purely scientific database *vis a vis* a commercially oriented database), key CBD principles may be a linking element in their regular operations. For example, just as a group of 17 botanic gardens of different parts of the world (including Kew, Missouri, New York and gardens in Brazil, South

Africa, Colombia) have established a common set of rules regarding their access and benefit sharing related activities, it may well be possible to develop a voluntary code of conduct to orient data and information centers activities in regards to their collection of data, distribution and affiliation with national, regional or international nodes.

7. Sharing of biodiversity related data and information or “repatriation”: the need for strategic planning.

As a general principle, the CBD – and other international instruments - recognise that the generation and exchange of information is a key and critical instrument through which conservation and sustainable use of biodiversity can be supported and enhanced and, ultimately, achieved.

Article 17 of the CBD makes a subtle distinction between the need for sharing and exchanging biodiversity data and information and its *repatriation*. Article 17(1) establishes that Contracting Parties “... *shall facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries*”. Publicly available sources refers to databases and information centres run by public or publicly funded institutions in opposition to private institutions and databases which might be subject to specific proprietary rights or policies which restrict access to them.

Furthermore, article 17(2) specifies that this exchange of information (and here is the express distinction) “... *shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialised knowledge, indigenous and traditional knowledge as such and in combination with technologies referred to in article 16, paragraph 1. It shall also, were feasible, include repatriation of information*”. Clearly, it sees this exchange and programmes as a form of benefit. As has been noted, international scientific access to specimens and on field research projects can be predicated on returning equity to countries of origin (or host countries) in the form of technology transfer and in kind assistance. Seminars and courses, equipment, co-authorship, student and professional exchanges, assistance with collections development and maintenance, assistance with fund raising and writing projects, could all lead to prolonged collaboration and the building of mature scientific partnerships (Hoagland, 1998).

Although the issue of repatriation has not been discussed in depth in CBD COP or SBSTTA meetings, it is an issue of growing interest. Most of the world’s *in situ* biodiversity is found in the tropics – and in a group of maybe ten or so megadiverse countries. In contrast, most of the world’s largest, best managed and financially stable *ex situ* conservation and research institutions are located in developed countries. These institutions

maintain a considerable sample of the planet's biodiversity and data and information related to it. A significant proportion of these samples have been obtained from the megadiverse, developing countries. This situation is the result of historical flows of biodiversity. Collections resulting from these flows and research tied to them have proved invaluable to the scientific (commercial and industrial) field.

In the context of the CBD, repatriation could be defined as a process of transfer of biodiversity related information, data, knowledge and expertise to a source country of the material which was originally obtained from that country and upon which this information, data, knowledge and expertise has been built.

This interpretation could be supported by a simple but possibly very valid argument: developing countries and their institutions have not benefited from the knowledge, expertise and know how housed in *ex situ* centres and research institutions in developed countries as much as they've contributed (quantitatively and even qualitatively) with a continued supply of biodiversity samples (and information) to build these collections.

There is certainly an element of added value and intellectual input which makes the issue much more complex. Scientific knowledge has contributed to make these tangible materials valuable (from a strictly scientific and sometimes economic perspective). But in some cases – take ethnobotany – materials have *also* flowed with extremely useful and valuable indigenous information which has also served the scientific process. Therefore the issue is hardly clear cut and self explanatory.

In certain circumstances, repatriation of data could become a useful process to serve a number of different but interrelated goals. It can play a role in capacity building in developing through revitalising national and research institutions; it can help to strengthen links between scientific institutions in developing and developed countries (improving co-ordination of conservation activities); and it can also assist conservation programmes in developing countries.

At the same time, certain constraints and limitations must be considered. Take the case of taxonomy. As some analysts state, repatriation is sometimes advocated without carefully appreciating the costs of this exercise and the nature of specimen-based information. This misunderstanding “... *can arise through a failure to appreciate that there are at least two rather different kinds of biological collections, regional and global, and that the large global collections are not simply bigger version of a regional collection. As a consequence, some people misinterpret the importance of large global biosystematics collections for biodiversity-related matters and over emphasise the value of specimen based data they contain. These factors combine to create*

pressure on museums with global representations to make available data about their specimen holdings. Such pressures have been augmented from the variety of international organisations wishing to use, for their own purposes, biosystematic information, yet who are unwilling to support the systematics infrastructure necessary to maintain and extract such data. Perhaps nowhere else are these pressures more apparent than in a very few large western museums with comprehensive international specimen holdings. Yet databasing the collections of such institutions is a formidable and extremely costly undertaking”. (Gauld, 1996).

Given this reality, planning a repatriation or even an information exchange exercise is critical in order to identify clear needs and how best and most cost-effectively to address them. Repatriation will, in most cases, directly involve a source country and a museum, or an *ex situ* conservation and research centre.

In very special circumstances, GBIF may play an active role in the process of repatriating needed (and solicited) information if, in turn, GBIF maintains or has access to this particular information.

Final considerations.

- Trust and confidence between GBIF, its data and information providers and, ultimately, users, is the best method to ensure an appropriate, ethical and equitable access to and use of data and information. There is no legal tool or mechanism (i.e. a contract) which can replace these two critical factors. Reliable sources and partners are key in this regard.
- GBIF could be at some point used for commercial or industrial purposes – in terms of the generation of products derived from the data and information it provides. These cases should be assessed on a case by case basis and take into account CBD benefit sharing principles.
- Some data and information provided could be considered confidential by providers (through the regional nodes). The key question is whether this type of information should be included in GBIF (subject to specific rules). Is it inevitable that this information will be part of GBIF? One option may be to exclude altogether any information that is subject to confidentiality requirements and ensure all information can be made widely and freely available to any interested party. This may overcome an important concern as a data and information facility.
- Not all data and information centers expressly recognise the universal need to produce and disseminate useful and reliable scientific information and make it especially available to developing countries. Many

of these countries are, quite literally, unaware of the existence of these information centers. Disseminating and raising awareness of the existence and operations of the GBIF (including through non Internet related means) is critical to ensure its success in and use by developing country institutions and individuals. Part of GBIF's role may be to train and build capacities in developing country institutions to make use of available data and information.

- GBIF is at a crossroad between the “two worlds” of research (public, academic research and science) and development (private, corporate industry). A critical area is that where policies and laws to ensure proprietary rights, don't unnecessarily hamper and affect the continued production of basic and pure informational and research tools. GBIF's institutional policy options regarding IPR will have an important impact flows and uses of data and information.
- Institutions providing GBIF with data and information or acting as GBIF regional nodes should adhere to basic ethical principles laid out as part of a Letter of Agreement which, in turn should be based on general principles of the MoU. Users of the data and information should adhere to the copyleft regime and adhere to a Letter of Agreement which includes benefit sharing provisions in cases where industrial products may be obtained through the application of GBIF's data and information.
- A copyright (copyleft) and disclaimer notice should be developed by GBIF to secure the interests of providers and users of GBIF (and GBIF itself).
- GBIF and the data and information it holds could, under special circumstances, play an important role in regards to assisting IPR offices worldwide in their evaluation of patent applications. They could use information from GBIF as a means to help verify novelty and inventiveness requirements of certain inventions (especially biotechnological inventions).
- As far as possible, GBIF should consider linking with non commercial, non for profit, open source, academic databases. Mixing and interphasing with private (or even to some extent commercially driven databases) could generate complex management problems in regards to access to and use of GBIF data and information (involving proprietary issues).
- GBIF's philosophy of making data openly accessible to all addresses in a positive manner the data repatriation issues. Once the data from specimens/species from countries of origin is openly accessible, it is open to all interest groups from any given country.

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