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Import and export of biological samples from tropical countries–considerations and guidelines for research teams

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Abstract 'Biodiversity' is increasingly perceived as an important resource for research and conservation, but also for economy. Conservation, access and sustainable use of biodiversity (genetic resources, species, samples) are negotiated on different political levels, resulting in an internationally binding legal framework. Resulting legislation is

Legal disclaimer This guideline *does not exempt* researchers of their personal or institutional responsibilities to inform and comply with *the relevant* regulations and legislation. The compliance with the current legislation lies in the responsibility of the respective researcher and/or research project. In addition, this guideline *does not claim* completeness or authority. Legal requirements for research projects differ and consequently demand adjustment of and/or consideration of perhaps relevant additional, local, or other permits and legal requirements.

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binding for all parties involved in biological sampling, i.e. researches and (and in italics) countries, and especially applies for tissue or DNA samples and dervied products thereof. Understanding and awareness of export and import permits for biological samples is increasingly important for biologists to perform research projects legally and timely. Nevertheless, some biologists are still exporting and importing biological samples ignoring or non-compliant with national and international legislation, conventions, and regulations. Resulting difficulties may not only cause serious problems during field work, but may also delay the export, import or exchange of samples. Comprehensive *a priori* information regarding legal requirements helps to avoid or at least diminish potential problems. We identified four major factors facilitating export/import permits: (1) good personal (mutually trusted) contacts in the country of origin, (2) understanding and compliance with all relevant laws and regulations; (3) access to information regarding knowledge on permits, regulations and laws including their circulation within the researcher communities; and (4) access to consistent and up to date regulations

Keywords Research samples · Collection · Export · Import · Legislation · Permits · Specimens · Convention on Biological Diversity CBD · Access and Benefit Sharing ABS · Convention on International Trade in Endangered Species of Wild Fauna and Flora CITES · European Union EU · Country of origin

Introduction

'Biodiversity' is increasingly perceived as an important resource for research and conservation, but also for the economy. Conservation, access and sustainable use of biodiversity (genetic resources, species, samples,…) are negotiated at all political and administrative levels, resulting in an internationally binding legal framework. This legal framework is binding for the parties (countries) but also for researchers involved in any biological sampling. Additionally, these binding legal frameworks apply also to tissue or DNA samples or derived products thereof. Understanding and awareness of export and import permits for biological samples is increasingly important for biologists to perform research projects legally and timely.

Many European biologists (especially taxonomists, systematists, biogeographers, ecologists) sampling territories outside of the European Community (→EC[1]) do not have detailed knowledge of the relevant permits, regulations, and laws–both, in the → country of origin as well in the EC and member states[2]–regulating export, import and international exchange of research samples. Non-compliance may cause damage or destruction of samples during inspection, interception or even confiscation. These interventions may disrupt or delay workflow, but could also even evoke lawsuits.

Basically, for export, import and exchange of research samples the Convention on Biological Diversity (→CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (→CITES), customs regulations, animal health and phytosanitary legislation need to be considered to allow entry of biological specimens into the EC. Several of these need to be considered already during the planning of research projects or for legal import of field samples.

Here, we present a rough guide with basic background information on selected international permits and legislations as well as on the respective European implementation regulations for imports of samples into the EC. We add recommendations on best practice for how to comply with regulations and to avoid sanctions during and after field work that might result in illegally collected samples. Legal issues related to export and import of samples were addressed on two workshops held on 25th March 2011 at the *Museum für Naturkunde*, Berlin, and 5th/6th May 2011 at the *Zoologisches Forschungsmuseum A. Koenig*, Bonn. We summarize some results of the first herein and add further reading on ABS (Nagoya Protocol), CITES permitting, shipping regulations (air transport) and selected relevant guidelines for researchers provided by other organizations (details and links in Appendix A).

Background

Access and benefit sharing

Within the CBD, a protocol on fair access and benefit sharing (→ABS) was developed. On the one hand, the protocol should guarantee the access to genetic resources which are recognized as relevant for all humans e.g. with regard to the usage of medicinal plants. On the other hand, ABS should guarantee that countries/indigenous/local communities providing genetic resources will benefit from the gains that result from the resources. Such gains are to be expected especially if the resource is transformed into a commercially usable product and sold on global markets. Examples are benefits from up-front payments, milestone payments, payments of royalties, and others. After about 20 years of negotiations, the implementation of an ABS

[1] We focus on the respective EC legislation but cite relevant international legislation, where appropriate.

[2] Some EC member states impose stricter or additional regulations—a few of these are briefly referred to but cannot be detailed here. The same applies for additional (stricter) amendments of international legislation or conventions implemented in European legislation.

regime was decided in the → Nagoya Protocol (www.cbd.int/abs/) in October 2010, which is signed by about half of the parties but not ratified yet[3] (i.e. at time of press, the Nagoya Protocol was not in force and hence not legally binding).

Germany and the EC signed the Nagoya Protocol on ABS in June 2011. This international framework provides rules and procedures to implement conditions on access to biological samples in an international context. The international community controls the Nagoya Protocol to guarantee access-permissions in a timely and transparent manner. According to Art.6 of the Nagoya Protocol, parties have to ensure legal certainty and clarity as well as fair and non-arbitrary rules and procedures on accessing → genetic resources. In addition, all parties have to provide clear and transparent decisions, in a cost-effective manner and within a reasonable time. Establishing clear rules and procedures for required *mutually agreed terms* (→MAT) is the major goal of the protocol. However, in addition to the largely commercial rules, the Nagoya Protocol stipulates special considerations for non-commercial research as in most cases scientists from scientific research institutions planning research projects in a country of origin will need genetic resources, like plant samples, not for commercial use but for taxonomic identification or further investigation in their labs (c. f. Martinez and Biber-Klemm 2010). Although there is no commercial background in such research projects, the ABS regulations apply to non-commercial research and a benefit sharing should be agreed. Therefore, the annex to the Nagoya Protocol lists a number of non-monetary benefits that can be proposed as parts of any agreement between a research institution and a provider. These proposed recommendations include *inter alia* capacity building, sharing of results, access to scientific information, joint publications, technology transfer or training on the use of technologies. Such activities are performed in many joint research projects anyway where, for instance, local institutions are project partners. All parties have to provide simplified measures on access for non-commercial research purposes; however, in case economic benefits arise later during the project, the change of interest from research towards commercial or patent status has to be announced right from the beginning of the project transformation (Fig. 1).

A major challenge for collectors of biological material in respective countries of origin is the identification of the locally responsible national authority to apply for access permits according to the ABS provisions (Fig. 1). The Nagoya Protocol asks parties therefore to designate National Focal Points (→NFPs) on ABS. The NFPs provide information on procedures for obtaining prior informed consent (→PIC) and establishing mutually agreed terms (Art.13.1). In addition, these procedures should accompany a process guaranteeing model contractual agreements provided by the NFPs. Information how to contact NFP is listed in Appendix B; however, since the Nagoya Protocol process is very new, implementation of NFPs and respective information will take some more time in most countries–information on NFPs is provided and regularly updated at www.cbd.int/information/nfp.shtm. Further information for baseline research is provided by the DFG (2008) and an Africa specific guideline on laws is available from http://www.abs-initiative.info/compendium.html.

[3] With the exception of Gabon. List of Signatories to the Nagoya Protocol: www.cbd.int/abs/nagoya-protocol/signatories/

International plant exchange network (IPEN)

Applying for a collecting permit often raises questions about the further circulation of the genetic resource, e.g. if plant material is transferred to a Botanic Garden. The worldwide community of Botanic Gardens carries out intensive exchange of plant material. To maintain this exchange system adjustments have been made to comply with the CBD.

Countries of origin frequently request transparent monitoring, which guarantees evidence of the source of the plant material at any time. To meet this requirement, the European Consortium of Botanic Gardens (→ECBG) agreed on a common certification and monitoring system: the International Plant Exchange Network (→IPEN). With their IPEN membership, Botanic Gardens adopt a common policy (Code of Conduct) which regulates the acquisition, maintenance and transfer of plant material in accordance with the CBD. Each plant genetic resource is tagged with a unique identifier (IPEN number), indicating the source country and the Botanic Garden that brought the material into IPEN and which stores all collecting data.

IPEN covers exclusively the transfer of plant genetic resources for non-commercial purposes. If the recipient of the material is not member of IPEN, a separate Material Transfer Agreement (→MTA) has to be signed. In the case of a commercial request, the interested party has to negotiate a PIC with the country of origin before the plant material can leave IPEN.

As national access legislations vary, the requirements of a country of origin need to be assessed carefully on a case-by-case basis. IPEN does not replace any national laws but is an important CBD tool strengthening the confidence of the countries of origin, enhancing long-term partnerships and facilitating access for non-commercial users of plant genetic resources.

Export, import, and transport

Recent amendments to international regulations and international conventions in addition with stricter controls implemented after the 9–11 attacks for hand carried and checked

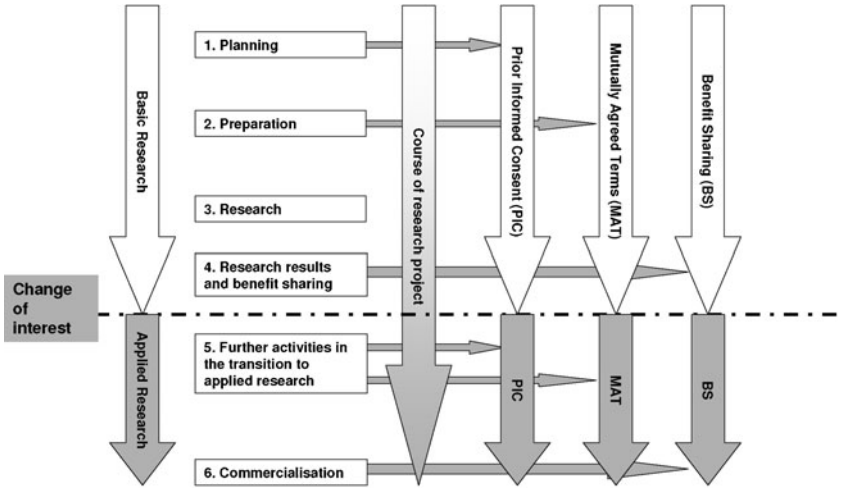

Fig. 1 Scheme illustrating the work flow for preparation and steps to consider for a project involving biological sampling and transportation with relevance for ABS (modified after DFG 2008)

luggage as well as for parcels are imposing seemingly insurmountable obstacles for export, import and international exchange of biological samples. In addition to national and international regulations, researchers are increasingly confronted with additional permits and licenses to collect in remote areas or sampling of endangered species. Ethical considerations (physiological stress, injury, or other) should be considered *in addition* to all legal aspects mentioned herein.

Besides official research permits, one may have to obtain and/or receive acknowledgement on different national or federal levels, or one need to consider local permits (e.g., fishing right holders, for entry and sampling in some national parks, private land). These local or institutional permits may be relevant and may be required to allow export of samples, e.g. permission by the Brazilian environmental authority → IBAMA for export of specific samples. Researchers are advised to obtain all relevant permits *prior* to field work. We cannot detail these for all countries here, but want to remind readers that illegal collecting or sampling may result in fines and other penalties, including impoundments or imprisonment for → biopiracy in some countries.

Export of biological samples requires an export permit of the respective country, in which the field work was conducted. For import of not preserved, fresh samples (including blood samples, hair and feather samples) additional health certificates issued from the respective veterinary and phytosanitary authority in the country of origin are required for entry (details in "Import of research samples into the EC"). For packing and transport of alcohol preserved or other chemically treated specimens, the relevant dangerous goods regulations apply (details in "Packing and shipping–practical considerations").

Packing and shipping–practical considerations

Research equipment and research samples are basically transported to and carried back home by means of air or sea transport, either personally or by courier services, and are only rarely carried by road. In particular preservative chemicals such as absolute ethanol, denatured alcohols, formaldehyde solution, or DNA-buffers are restricted *per se* or because of the contained chemicals from land, air or sea transport.

Links for restrictions of dangerous goods by road (→ADR) and sea (→AND) transport are provided in the glossary. The restrictions for air transport are imposed by → ICAO and implemented by airlines in the → IATA Dangerous Goods Regulations, which are the strictest regulations for classified hazardous materials (→"HazMats"). We will therefore focus on the latter two for practical reason as the majority of samples are transported by air.

Chemicals or substance, which are either identified by → UN numbers (such as UN2209 for formaldehyde, UN1170 for ethanol, and UN1845 for dry ice) or indicated by diamond shaped hazard labels are prohibited from normal transport. This may also apply for chemical mixtures, e.g. ethanol based buffers used to stabilize tissues or DNA. An additional indication for (classified) dangerous goods is the original packing of the chemical in question which may include hazard and precaution statements (H- and P-phrases). Further information on these chemical can be found in the respective Material Safety Data Sheet (→MSDS). Packing and shipping of classified substances requires either personal IATA certification or an IATA certified carrier who packs and marks the respective shipments according to the IATA Dangerous Goods Regulations (IATA- → DGR). Even though the IATA-DGR implements all internationally agreed ICAO regulations verbatim, it includes additional restrictions imposed by individual airlines for general transportation or specific UN numbers. We highly recommend the yearly updated IATA Regulations for your reference (IATA Dangerous Goods Regulations 2012).

While IATA allows the shipment of dangerous goods as Excepted (→EQ) and Limited Quantities (→LQ) if special packing instructions are met, international postal services

exclude any hazardous materials and all flammable liquids from postal shipping (World Customs Organisation, Universal Postal Union 1998, p. 26). Sending of *small ethanol tissue vials as letter or parcel thus is strictly prohibited*. After the 9–11 attacks strict screening procedures for postal shipments were implemented, focusing especially on the discovery of liquid dangerous goods. Parcel bomb incidents in 2010 revealed gaps in the screening lines in international mail transit. Forthcoming amendments will include even stricter screening procedures targeting for hidden HazMats and especially liquids. The official shipping contract terminates on the spot when concealed HazMats are detected. If intercepted parcels are not immediately destroyed or otherwise disposed of, the sender is held responsible and charged for all further measures related to the withheld shipment.

In general, all samples packed should withstand a drop from a height of 1.2 m and should be leak-proof. Formaldehyde is a dissolved gas in aqueous solution (maximum strength 37%) and can readily penetrate plastic packing. UN certified overpacks such as tight closing plastic drums that can withstand low air pressure and deep temperatures in belly compartments of aircraft are recommended as transport containers. UN-approved and certified overpacks should be your preferred way of packing.

Formalin (UN2209) preserved specimens in formalin solution less than 10% strength are not restricted by IATA; solutions equal to 10% but less than 25% are restricted under UN3334 in class 9, aviation regulated fluid; above 25% strength samples are restricted as corrosive substance in class 8. EQ and LQ shipping of' formalin solutions above 10% strength is allowed, but requires IATA certification for packing, adequate marking and labeling according to IATA-DGR. For EQ, the maximum fluid per inner packing must not exceed 30 ml, the total volume per consignment must not exceed 1 l.

The preservatives ethanol (UN1170), formaldehyde solution, flammable (UN1198, methanol stabilized), isopropanol (UN1219) and alcohols, not otherwise specified (UN1987) are derogated and not part of the IATA-DGR, unless the person packing the shipment has received adequate training and packing complies with IATA special provision → A180 (c. f. IATA-DGR 2012, p. 347–348[4]). Special provision A180 demands that EQ volumes and restrictions are not exceeded. Additional heat-sealing with polyethylene (PE)-foil is mandatory.

Carry-on and checked luggage

Carrying any dangerous goods in the hand or checked luggage is strictly forbidden. However, we received different interpretations from legal authorities regarding carrying EQ derogated under A180. This needs further investigation. It might be worth negotiating with the respective airlines prior to booking of a flight, if they do exempt small ethanol vials packed according to A180 (vials/boxes containing vials three times heat sealed in PE-foil and packed with sufficient absorbent) in the checked luggage. If yes, single volumes must not exceed 30 ml, total volume per luggage/piece must not exceed 1 l (applies *only* for UN1170, UN1198, UN1219, UN1987!). Special provision A180 requires marking as "scientific research samples" on issued air waybills and electronic declaration (→E-Decs). This information is neither required for checked luggage or needed to allow check-in, but respective information might be required or needs to be presented on request by airlines.

Export of research samples from third country (non-EC)–legal requirements

Export and import underlie the respective customs regulations of the respective country, except for shipments transported *within* the → Schengen area of the EC. Even though Switzerland, Norway, and Iceland are associated Schengen states, postal and cargo shipments are checked at border inspection posts by customs.

Customs authorities are in charge of fiscal-related issues e.g. import turnover tax, detection of contraband goods, and observance of the relevant species protection legislation during export and import. For export this may include additional checks on valid research permits and compliance with export limitations for specific (research) samples e.g. in the USA., Brazil, Cuba, Egypt, or Turkey.

Authorities in charge of issuing export permits may vary in each country and with the type of sample. For living specimens in general, and for any fresh or dried samples of ungulates and birds, EC health certificates must be issued from the respective veterinary authorities in the country of origin of the sample. Without these, import may be denied or allowed only by exceptional permissions. These health certificates must be applied for at the respective national or federal authorities before departure for field work. It may be worth considering shipping fresh samples under UN3373, biological substance, category B [potentially infectious; applies especially for ungulates and bird samples] using standardized packing to meet marking requirements.[5] Several large airlines, including Air France (AF), Lufthansa (LH), or United Airlines (UA), do have additional limitations for UN3373 and either do not accept these samples in the checked luggage, cargo, or on board at all, or require *a priori* authorization.

[4] Barcoders welcome new rules for shipping specimens: 'Dangerous goods' classification was removed (http://ibol.org/barcoders-welcome-new-rules-for-shipping-specimens-2/)

[5] Compare http://www.lgl.bayern.de/tiergesundheit/empfehlungen/doc/hinweise_versand060317.pdf

Compared to export, veterinarian legislation adds to the field of law for import. However, animal health and sanitation legislation is not monitored by customs but by veterinarian authorities at the respective border inspection post. Note that not all international airports operate veterinarian border inspection posts. As a consequence, animal shipments (regardless of whether preserved or not) cannot be imported via all airports.

Import of research samples into the EC

Import of samples need to comply with three fields of law: (1) customs law, (2) European and international conventions on species protection and (3) veterinarian legislation. A fourth, ABS (sections "Background" "Access and benefit sharing"), will soon become relevant, a fifth, IATA regulations, deals only with transportation and packing restrictions (section "Packing and shipping–practical considerations").

Except for animal health, customs enforces relevant regulations and laws (exceptions apply e.g. for Switzerland). This applies for checked luggage and air cargo and all samples carried personally on the ground by car. For air cargo this is done jointly with the carriers, which have to monitor and report to customs on so-called bio-shipments.

For postal shipments in general, surveillance and compliance with the relevant legislations for all fields lies within the responsibility of the respective postal carrier. Their monitoring is dependent on information issued by carriers in the E-Decs or in the shipping documents of respective consignments. Hence, all relevant fields concerning legislation must be adequately addressed in the E-Decs *and* in the shipping docs (and additionally on conventional air waybills, if issued) because translation of data from written into electronic form is in many times defective and prone for data loss. The national postal services of EC member states have lost their old privileges and have to employ stricter standards. Compared to commercial carriers, who inform customers of intercepted shipments, national postal services rarely offer (international) tracking of their shipments. This can result in limited interference and/or notification options which can entail the loss of specimens.

Clearance of parcels sent with large commercial carriers, such as DHL Express, FedEx, UPS, TNT is done based on the E-Dec information, normally *prior* to the departure of parcels in the respective country. Inadequate, misleading or missing information in the E-Dec will set shipment status on "hold" and trigger subsequent customs and/or veterinarian inspection. The following data should be included on a proper shipping doc:

- Full (institutional) address of consignor;
- Full (institutional) address of consignee;
- Type of material, preservation and/or subsequent conservation method;
- Customs tariff number of zoological/botanical/anthropological collections objects: 970500000;
- Exclusion of (potentially) epizootic materials;
- Exclusion of protected specimens or information of protection status and/or CITES labels/certificates (if required);
- If applicable, indication of loan status and proposed application of samples (e. g. morphological/molecular research);
- Country of origin (here the *home country of the collection*, not the country samples were originally collected);
- Value of goods/declared value must not be zero but should between 5 and 10 EUR/USD;
- Explicit mention of non-commercial nature of samples.

Parcels with personal shippers' names preceding any institutional information in the consignee addresses may be treated as "private/personal shipment" by customs (at least in Germany). Private shipments are suspected for contrabands or drug smuggling and have a high risk of interception and inspection. In reported cases delicate specimens, such as dried insects, have unintentionally been damaged with broken parts being discarded after inspection. Therefore, the institutional information should *always precede* personal names in the consignee's address to avoid private shipments. It is advisable to add additional information on any legal authority or expertise that your institution may hold to the shipping doc, such as institutional CITES numbers (section "Species conservation" "CITES").

For veterinarian and in parts for customs inspection, parcels are in most cases presented and opened bottom side *by carrier staff*. The bottom thus should be sufficiently cushioned to avoid damage or cutting of sealed bags or specimens. Repacking is done again by carriers. Note that it is unlikely that these staff have the necessary training (and therefore are not allowed to) repack specimens packed under IATA Special Provision A180. This may have direct (positive or negative) consequences for opening of parcels containing specimens packed according to A180.

Watch out for further workshops at the museums in Berlin and Bonn in cooperation with the → Humboldt-Ring and → GfBS (currently only in German).

Species conservation

CITES and international species conservation

As an example, this section describes the regulations regarding CITES and other legislation concerning the cross-border transport of specimens of protected species for Germany.

Regulations

For the import of scientific samples of protected species from countries outside of the EC or for the export or re-export in countries outside of the EC, the regulations on species protection have to be followed painstakingly. Therefore determination of the species protection status is warranted. Specifically, researchers should pay close attention to Annexes A, B, C and D of the Council Regulation (EC) 338/97 (for the implementation of CITES inside of the EC), the Annex IV of the Fauna-Flora-Habitat Directive of the EC (→FFH Directive) and the Annexes of the European → Birds Directive.

The German Federal Agency for Nature Conservation (→BfN) has developed the database → WISIA in which all currently protected animal and plant species are specified (information at www.wisia.de). If the species of questions is listed in any of the Annexes mentioned above (i. e. has protection status), several official documents are required for the import (Table 1), export, or re-export (Table 2).

Import permits of species listed in annexes A and B of the Reg(EC)338/97

For Germany, submit applications to the BfN with the application form No. 221 (download http://www.bfn.de/0305_CITES.html, form 221 and 222 on the right margin) and a copy of the CITES export permit of the country of export (i.e. country of origin) *prior* to the import. A detailed description of the intended project is additionally required for scientific samples of species listed in Annex A Reg(EC) 338/97 and for species listed in Annex B Reg(EC)338/97, for which the EC issued an import ban (official: import suspension) for commercial purposes. In both cases, import permits can only be granted if the scientific authority supports the application with a positive statement for import of the samples.

Import notifications of species listed in annexes C and D of the Reg(EC)338/97

Apply directly at the customs office of import with the form No. 223 (form available at the customs office) and with the originals of the CITES export permits/certificates of origin.

Exception permits of species listed in annex IV of FFH-directive or in annexes of birds-directive

For Germany, submit applications to the BfN *prior* to import including the following data: species; description of the items; source; country of origin; intended purpose; detailed description of the intended project. There is no official form for this kind of application; use a standard letter from your institute.

Export permits/re-export certificates of species listed in annexes A, B and C of the Reg(EC)338/97

Submit applications to the BfN *prior* to export or re-export with form No. 221 (see applications for import permits). In addition, hand in together with the application the proof of legal import into the EC of the samples (copy of the import permit or import notification) or a proof of the legal acquisition inside of the EC *prior* to the export or re-export.

Handling of documents, import permits, and import notification

For species listed on Annexes A & B, the original and yellow copy of the *import permit* and the original of the CITES export permit have to be presented to the authorized customs office at the point of import. The yellow copy of the *import permit* is returned back to the importer after clearance by customs. This document is considered as proof of legal import.

For species listed on Annexes C & D, the original and yellow copy of the *import notification*–filled in by the

Table 1 Exemplary documents for Germany needed to import samples from species listed in CITES

Annex	Legislation docs	Convention	Required documents
Annex A	Reg(EC)338/97	CITES	CITES-export permit and import permit
Annex B	Reg(EC)338/97	CITES	CITES-export permit and import permit
Annex C	Reg(EC)338/97	CITES	CITES-export permit or certificate of origin and import notification
Annex D	Reg(EC)338/97	CITES	Import notification
Annex IV	FFH-Direction	FFH-Direction	Exception permit of the BfN
Annexes	Birds Direction	Birds Direction	Exception permit of the BfN

For other EC member states contact the respective national CITES authorities; address and directions are available at www.CITES.org

Table 2 Documents needed to export or re-export samples from species listed in CITES

Annex	Legislation docs	Convention	Required documents
Annex A	Reg(EC)338/97	CITES	CITES-export permit or re-export certificate of the BfN
Annex B	Reg(EC)338/97	CITES	CITES-export permit or re-export certificate of the BfN
Annex C	Reg(EC)338/97	CITES	CITES-export permit or re-export certificate of the BfN
Annex D	Reg(EC)338/97	CITES	No. documents required
Annex IV	FFH-Direction	FFH-Direction	Exception permit of the BfN or of the Federal State authority
Annexes	Birds Direction	Birds Direction	Exception permit of the BfN or of the Federal State authority

importer himself–and the original of the CITES export permit or the certificate of origin have to be presented to the authorized customs officer at the point of import. The yellow copy of the *import notification* is returned to the importer after customs clearance and serves as proof for legal import.

Export permits/re-export certificates

The original, yellow and green copies of the export permit/re-export certificate have to be presented to the authorized customs office at the point of export. The original and yellow copy of the document are given back to the exporter after the customs clearance. The original has to accompany the shipment and is required for the import into the country of destination. The yellow copy is considered as proof of legal export for the exporter.

The exception permit, issued by the BfN or by the responsible Federal State authority, has to be presented to the authorized customs office at the point of import or export in duplicate copy. The 'copy of the holder' is returned to the importer or exporter.

Special procedures and simplified procedures regarding trade with biological samples

Scientific institutions can apply at the responsible federal or national authority to participate in the 'label procedure'. The 'label procedure' enables exchange of herbarium materials, preserved, dried or embedded museum specimens and live plant material for scientific studies with other registered institutions after registration. The labels, filled in by the registered institutions themselves, replace the above mentioned requirements for CITES import and export permits. For imports to the US, a "Certificate of Scientific Exchange (→COSE) (CITES)" must be issued.

In cases, where trade has no or only a negligible impact on the conservation of species concerned, the interested institution can apply at the BfN to participate in the simplified procedure for Germany. Approval is only possible if the scientific authority has given a positive statement. After the registration for the simplified procedure the participants receive the requested number of 'blank-permits'. The participants have to complete these 'blank-permits' by themselves for the transaction in question. Such permits may only be used for biological samples of the type and size specified in Annex XI of the Commission Regulation (EC)865/2006.

The legal basis and laws as of 2011 are listed in Supporting Material Appendix C. Further reading on CITES and currently working links are listed in Supporting Material Appendix D.

National legislation

As seen in 3.1., transport of specimens into, within and out of the EC can be governed by different legislation, depending on the degree of protection. Besides species listed in CITES Annex I to III, which are transferred to categories A, B, and C in the EC legislation, an additional category D is introduced. This is reserved for species traded to such a degree that warrants control of import numbers into the EC or for species listed in Annex III where reservations are made (details in Appendix E).

However, legislation of EC member states does not end here, because each of the member states introduced its own legislation for CITES and the EC Birds and FFH directives (details in Appendix E). Besides the EC legislation, member states cater for individual needs in national laws and directives, all of which must be considered for legal transport of specimens. For EC member states, we identified different cases of international transport of protected specimens:

(1) Transport of specimens of protected species from a third country into the EC: if applicable, CITES regulations must be followed (see "CITES and international species conservation") and national legislation regarding the possession and trade of protected specimens must be adhered to. For an overview of the national legislation of each of the 27 member states see http://www.eu-wildlifetrade.org/pdf/en/2_national_legislation_en.pdf.
(2) Transport of specimens of protected species within the EC: shipping of CITES species within the EC is treated as domestic shipping provided the collecting of the specimen complied with all legislation regarding the

species' protection at the time of collection. As stated in Table 2, species protected under Council Regulation (EC) No 338/97 Annex C and D do not need any documentation for transport from one member country to another one. Nevertheless, national legislation regarding possible additional protection of this species must be adhered to (cf. 1)

(3) Transport of specimens of protected species from an EC member state to a third country: As with import into the EC, export of specimens of protected species from the EC is governed by international, EC and national legislation. For species protected under CITES and/or EC Annexes A, B or C, the documentation according to Table 1 is required. In addition, the national laws and regulations of the importing country must be followed for any species that is protected under this legislation.

Given these different requirements for each country of destination, a researcher who wishes to transfer a sample or a specimen from a non EC-country to a member state needs to carefully research which rules apply on European and national level. Some countries provide a database to facilitate this search, whereas for others, the researcher has to consult the legislation. For example, if a researcher wishes to get a specimen of *Patella ferruginea* Gmelin, 1791 (Ribbed Mediterranean Limpet), an endangered limpet species endemic to the Mediterranean, from Algeria to the United Kingdom, research into the status of this species would probably come to a dead end since for Algeria, no specific protection of *Patella* can be found in the legislation (http://www.droit-afrique.com/images/textes/Algerie/Algerie_Environnement.pdf) and from the website of the Ministry of Environment (http://www.mate.gov.dz/index.php?option=com_docman&task=search_result&Itemid=152#) and for the United Kingdom, where this species is not listed on the spreadsheet issued by the Joint Nature Conservation Committee (http://jncc.defra.gov.uk/page-3408). Therefore, no additional documents regarding the protection status of this species would be needed for transport. However, if the transport from Algeria would end in Germany, this species is protected as "*streng geschützt*" (strictly protected) by the German *Bundesnaturschutzgesetz* ('BNatSchG'–Federal Nature Conservation Act, details in Appendix C). This is a result of the national legislation implementing the EC FFH Directive. Whereas Germany provides strict protection for all species listed under Annex IV of this directive regardless of whether they naturally occur within its boundaries, Great Britain only provides protection for those species of Annex IV whose natural range is within or extends into its boundaries. The German implementation of this directive prohibits possession and trade of the species under its legislation. For the import of such a specimen from third countries into Germany an exceptional permission issued by the BfN is required. If the specimen in question was taken from the wild inside of the EC or was imported from third countries into other EC-member states an appropriate confirmation issued by the competent authority of this member state is required. The example of *Patella ferruginea* illustrates the need to research the protection status of each species intended for import into the EC. Whereas a comprehensive database is provided for Germany (WISIA), a database containing information for each of the member states is not available. Nevertheless, a website listing national legislation is available in several languages (European Commission: http://www.eu-wildlifetrade.org). Since the harmonization of member state legislation within the EC (considering the diversity of habitats as reflected in the diversity of national legislation) is not to be expected soon, a suitable approach for the facilitation of legal transport of research specimens would be a database similar to the CITES database or WISIA, but extended to the EC or globally. Due to legal considerations, a government-driven approach similar to WISIA should be favoured over other options.

Veterinary legislation and EC animal by-product regulations

Import of (preserved) animals and parts thereof into the EC is regulated by European veterinary legislation. Commission Regulation EC No. 1069/2009 replaced the former regulation EC 1774/2002 and became effective together with the implementing regulations EC No. 142/2011 on 4 March 2011. All biological research samples of animal origin have to be treated as animal by-products (→ABP) (M. Klemencic, →SANCO, pers. comm. 29 June 2011). While commercial companies and agricultural businesses "will be able to take advantage of the new import rules from 4 March 2011", "rules have been included for the import [of ABPs] for research and diagnostic samples […] Competent authorities [in EC member states] will need take account of these rules when authorizing the import of these products […] For example, trade samples and display items will have to enter the EU through a border inspection post and undergo veterinary checks".[6] This includes loans which are returned to EC member state institutions (EC origin, previously exempt from inspections).

Inspection costs range from 130 to 180 € each. This sums up to approximately 300,000 € for the 2,071 parcels containing preserved natural history specimens exchanged between 42 major scientific institutions in the U.S.A., U.K. and Germany (survey by A. Bentley for the Society for the Preservation of Natural History Collections → SPNH, 2009, pers. comm. A. Bentley).

[6] http://archive.defra.gov.uk/foodfarm/animaltrade/imports/pdf/abp-regs-changes-101230.pdf

Import regulations for fresh vs. preserved samples differ: all fresh samples, including feathers, horn, hair, blood, feces, but with the exemption of dried insects, require health certificates from the country of origin for import. Import licenses may be applied for at local federal or national authorities prior to field work in order to facilitate import of collected samples returned from field work (e. g. in checked luggage). Veterinary checks for these samples at the border inspection post are mandatory, including samples shipped under UN3373. Not every airport operates a border inspection post (sections "Import of research samples into the EC" and "Export of research samples from third country (non-EC)–legal requirements").

Import of preserved "research and diagnostic samples requires specific commercial documentation (and [a priory] authorization from competent authority as of now [4 March 2011])"[4]. All scientific research samples (see marking requirements for IATA Special Provision A180) collected from wild or domesticated (zoo) animals or parts thereof are considered as ABPs regulated under EC animal by-product restrictions (M. Klemencic, SANCO, pers. comm. 29 June 2011).

According to Art.17, EC No. 1069/2011, "The competent [federal or national] authority [of the respective member state] may, by way of derogation from Articles 12, 13 and 14 authorize the use of animal by-products and derived products for exhibition, artistic activities, and for diagnostic, educational or research purpose under conditions which ensure the control of risks to public an animal health." This means that since 4 March 2011, all imports of research samples to the EC require *a priori* authorization of the competent authority of the respective member state, which restricts subsequent usage of these samples. However, derogations in articles 12, 13 and 14 regulate only disposal for Category 1 materials with very high infection risk (BSE carcasses and suspects, specified risk material and catering waste from international transport), Category 2 materials with high infection risk (condemned meat, manure and gut contents) and Category 3 materials with low infection risk (slaughterhouse waste, rotten meat). This is the only regulation provided for research and diagnostic samples in EC No. 1069/2009 and EC No. 142/2011.

Despite being derogated from Articles 12, 13 and 14, import restrictions for research samples require categorization into either Category 1, 2 or 3. According to M. Klemencic (SANCO, pers. comm. 29 June 2011), research and diagnostic samples of animal origin must be categorized as Category 2. Because of high infection risks for animals potentially spread from Category 2 material, such samples will be inspected if imported (pers. comm. border inspection Cologne/Bonn), regardless of any interpretation SANCO may present.

Import requirements for research samples are laid down in Annex VI, Chapter 1 Section 1 in EC No. 142/2011. Formalin-preserved samples, or samples which have been treated with similar preservatives inactivating any potential pathogen or epizootic, are not excluded. It lies in the discretion of the respective border inspection officer, whether these shipments are inspected or not–provided the accompanying shipping documentation indicates and details treatment and preservations methods of included samples. Only dried spiders and insects (but not invertebrates in general) are currently exempt from inspection.

Research samples addressed to destinations in the UK or Switzerland need to be accompanied by an import license, which must be obtained from the respective receiving museum. From Italy, problems with commercial couriers are reported, which deny import of biological shipments due to lacking legal certainty.

To request *a priori* authorization, you need to know the international gateway, as the respective border inspections posts may be under differing jurisdiction (e.g. in Germany). Air cargo imports are easy to predict as their routing depends on the agreements as listed in the order fulfillment. Predicting the entry gateway for shipments or forwarded shipments by national postal services (compared to international postal carriers like FedEx, UPS, TNT, etc.) is impossible as consignments are routed on board commercial passenger flights. As point and exact time of entry remain unknown, prior authorization is not conceivable for postal shipments.

Receiving or returning specimens without *a priori* notification to the receiving museum situated in the EC or associated Schengen Area is increasingly difficult and should be avoided to minimize potential risks for specimens. The same applies especially to undetermined specimens merely sent for identification to taxonomic experts, such as invasive species or agriculture dermestids, including species which are or may act as vectors for disease.

These unresolved issues and bureaucratic burdens have been emphasized in several inquiries and petitions by scientific societies and associations since 2009 regarding proposed amendments to EC No. 1069/2009 and EC No. 142/2011 to national and EC authorities. In the course of ongoing negotiations SANCO agreed to add special verbiage to exempt preserved (e.g. alcohol or formaldehyde) specimens for the promotion of biodiversity research under Annex XIII, Chapter VI, point C(1)(e) exchanged between biodiversity repositories in forthcoming amendments of EC No. 1069/2009. These stipulations will be enforced hopefully around March 2012, setting aside licensing or authorization requirements detailed above.

Phytosanitation certificates

Import of living plants from non EC countries into the EC is restricted. To facilitate import, we summarize current

regulations. Generally, any living plant to be imported into the EC must be accompanied by a plant health certificate stating that it is free of any serious pest or disease. The relevant pests and diseases are listed in the Appendices I and II of the EU directive 2000/29/EG. Only small numbers of plants from European and Mediterranean countries may be introduced without such a document.

People or institutions importing must be registered at the respective plant health institutions of the importing country. In Germany, these are the plant protection services of the federal states. It is advisable to contact these institutions during project preparation in order to comply with all regulations. Plant health certificates are issued in the country of origin of the plant material.

Different countries have different national plant health regulations. It is important to explore these regulations at an early stage of a project in order to avoid unpleasant surprises. For instance, in Sarawak (Malaysia) phytosanitary certificates can be issued only for cultivated plants. If a project includes export of living plants from the wild, a partner willing and able to cultivate the material collected for some time is necessary. In addition, collecting permits and export permits are needed. A plant health certificate might be essential to obtain an export permit *per se*.

Plant health certificates must be typewritten in an official EU language together with the list of the plants (scientific names) for import. The certificate cannot be issued more than 14 days before the day of import. A blueprint for certificates in Appendix I of the directive 2004/105/EG should be followed strictly. Phytosanitary import inspections have to be requested prior to the import itself (in Germany possible online at http://www.pgz-online.de/). Inspections are likely to charge a fee, so funds for inspection costs should be considered during project planning. As the directive 2000/29/EG is effective of all EU countries, phytosanitary import regulations are similar across EC member states.

Import of specific plant taxa from specified countries of origin is strictly forbidden in order to prevent spread of pests and diseases not yet detected in the EC. Such prohibitions apply, e.g., for the genera *Vitis* and *Citrus* from non-EC states as well as most gramineous and all coniferous species from non-EC states. A list of all prohibited taxa and origins is given in Appendix III of the Plant Inspection Order (*Pflanzenbeschauverordnung,* →PBVO). Import of such prohibited taxa might be desirable for scientific purposes, in which case an exception permit must be applied prior to import. To increase the probability to obtain an exception permit, it can be helpful to explain strategies to prevent the spread of pests or diseases from the facilities where the research is conducted.

Restrictions apply also for seed import of various species; for example, seeds of *Brugmansia*, *Phaseolus*, and *Pinus* are restricted, because they may be vectors.

International exchange of living plant material may unwittingly help plant pests and diseases to spread. To meet such problems, the FAO has issued the International Plant Protection Convention (IPPC), an international agreement on plant transfer. Although not mandatory as such, its tenor and issues have been incorporated into current EC regulations.

Information flow

During the workshops, one of the main issues identified by the scientific community was limited to non-existent information flow. Specifically, undergraduate or graduate students and researchers, several postdocs and even senior research staff are hardly aware of the laws, rules and procedures mentioned above. While governments and authorities do provide information on all issues mentioned elsewhere, this information typically is either not intuitively available or needs to be specifically addressed to raise awareness within the research community. This includes aspects on various projects and responsibility levels:

Prior to the start of the project and during planning

Establishing early contacts with local researchers and responsible authorities on ABS procedures (non-monetary), field permits, research permits, and export permits is vital. Check for conditions and fees that might apply. Supervisors and advisors should inform their students from the beginning on all legal issues regarding collection permits, export, transport and import.

During the project and while employing (under-)graduate students and junior researchers

Maintain information flow between all members of the research team during field work in third countries (including changes in permits, expired permits, new rules, responsibilities, changes in national and international legislation affecting granted permits, etc.).

After project termination and for publication

Make sure that respective research permits are mentioned in all publications (e.g. in the acknowledgements) which should be co-authored by promising researchers from country of origin (of the biological sample) and/or cooperating country. All previously mentioned aspects typically cover much of the ABS if mutually agreed upon.

A checklist and key to your permit

The following key (Table 3) is an overview that guides you to the most important permits regarding export and import of biological samples (Fig. 2). Since legislation and rules might change at anytime, please carefully check for future changes.

Further considerations and some identified problems

In addition to international and EC laws and regulations considered so far, national legislation in the exporting country might be relevant. These may be very specific and can vary from no further to strict regulations. We recommend preparing specific checklists for each country during planning and preparation for cooperation. Many NFP (in importing and exporting countries) should provide information on national legislation.

During the above mentioned Berlin workshop, we identified the following major problems involving export of biological samples from the tropics into the EC (with potential relevance for Non-EC states and foreign territories as well as exports from the EC to other territories):

(1) Personal and mutually trusted contacts in the exporting countries are the most important key to successfully receive export permits. All cooperation between scientists in country of origin and destiny with personally trusted relationships at a mid to high level (e.g. universities or authorities) typically facilitate the export permits and smooth all controls in the country. In addition, the cooperation partners in most cases know all national legislation well enough to support export permits. In turn, non-monetary support of the cooperation will increase motivation of in country contacts to support export of specimens.

In several countries very strong → NGOs are operating for quite different purposes and sometimes even obstruct for political reasons cooperations or circumvent access to biological recourses for a variety of reasons. In turn, some NGOs are supportive of such permits. In any case, some politically very active and strong NGOs need to be incorporated in the permit procedures.

(2) Ignorance, negligence, or misunderstanding of relevant laws and regulations is the most common issue in not obtaining permits (on time). In addition, national legislation is in many times not known, drafted in foreign languages or not available at all. Currently, the Nagoya Protocol supposedly claims NFP to support researchers on their way through all permits, both in importing and exporting countries (implementation of NFPs currently underway).

(3) Information should be made available at the European scale. A central database should provide information on protected species (as e. g. WISIA or CITES) including legal regulations on national scale.

(4) Access to information and spread of knowledge about permits, regulations, and laws to other researchers, especially students, will rise awareness and avoid unnecessary problems regarding permits. Supervisors (B. Sc., M.Sc., Ph.D.) should comply with their responsibility to inform (on time) on permit issues and inform themselves as well as their students about procedures, limitations and necessities. In addition, during application for funding, (a) the funding organization should incorporate time to allow for long procedures to receive permits before research starts and (b) funding applicants should inform and allow time to prepare such important prerequisites to best practice way before the project begins.

(5) Some regulations are inconsistent or contradictory. To allow compliance with all regulations, legislators should revise all potential contradictions to facilitate researchers' work and output.

In general we recommend that authorities, funding organizations, and NGOs provide contact persons and/or helpdesk functions for biologists to support all aspects of the permit procedures as well as provide information. In addition a list with working ABS NFP for the CBD NFP and → GTI NFP would provide first contacts avoiding uninformed scientists having to claim they had no idea and no chance to obtain proper information. Last but not least, the term 'genetic resources' needs clear definition in all relevant literature, including a workable definition and understanding of authorities to distinguish between (1) economic applications of genetic resources and (2) baseline research with genetic resources.

The new ABS regulations do not necessarily confront scientists with unachievable obligations but in contrary may provide some guarantee of legal security for research activities. Depending on the national ABS legislation of repsective countries the process of obtaining a research permit can be time-consuming, may need a local partner and may incur travel costs even before a funding application can be handed in. Research funding agencies would have to adjust or keep up their funding schemes in a way that allows for such extra costs and time during development of a research project which then fulfils the ABS regulations.

Table 3 Checklist for permits most likely needed for your research. Always check for national standards and laws as early as possible

Mode of transportation	Type of sample / specimen & preservation method	Veterinary		Phytosanitation		CITES listed species		Customs declaration		IATA		Shipping docs specifies		
		health certificate	check border inspection post	health certificate	check border inspection post	among CITES institutes	one/none CITES instute	country of origin	value of goods	regulated	A180	preservation methods	protection status	include import licence
letter	fresh (plant/animal tissue/blood)	prohibited	yes			label	permit	required	required			yes	yes	yes
	alive (plant/animal tissue/blood)	prohibited	yes	required	yes	label	permit	required	required	restricted	restricted	yes	yes	yes
	dried plants (or parts thereof)			required	yes	label	permit	required	required					
	dried fungi (or parts thereof)			required	yes	label	permit	required	required					
	dried invertebrates	no	no			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	other dried samples (hair, horn, feathers, …)	yes	yes			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	embedded microslides	no	no			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	formalin fixed (4–10%, UN2209)	prohibited		prohibited		label	permit	required	required					
	formalin fixed (UN1198, flammable)	prohibited		prohibited		label	permit	required	required					
	alcohol preserved ethanol absolut (UN1170)	prohibited		prohibited		label	permit	required	required					
	ethanol based buffers (UN1170)	prohibited		prohibited		label	permit	required	required					
	isoporpanol (UN1219)	prohibited		prohibited		label	permit	required	required					
	alcohols *nos* (UN1987)	prohibited		prohibited		label	permit	required	required					
small parcel	fresh (plant/animal tissue/blood)	prohibited	yes			label	permit							yes
	alive (plant/animal tissue/blood)	prohibited	prohibited			label	permit							prohibited
	dried plants (or parts thereof)					label	permit					yes	yes	if required
	dried fungi (or parts thereof)					label	permit					yes	yes	if required
	dried invertebrates	no	no			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	other dried samples (hair, horn, feathers, …)	yes	yes			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	embedded microslides	no	no			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	formalin fixed (4–10%, UN2209)	prohibited		prohibited		label	permit							if required
	formalin fixed (UN1198, flammable)	prohibited		prohibited		label	permit							if required
	alcohol preserved ethanol absolut (UN1170)	prohibited		prohibited		label	permit							if required
	ethanol based buffers (UN1170)	prohibited		prohibited		label	permit							if required
	isoporpanol (UN1219)	prohibited		prohibited		label	permit							if required
	alcohols *nos* (UN1987)	prohibited		prohibited		label	permit							if required
packet	fresh (plant/animal tissue/blood)	yes	yes			label	permit					yes	yes	if required
	alive (plant/animal tissue/blood)	yes	prohibited			label	permit					yes	yes	if required
	dried plants (or parts thereof)					label	permit	required	required	not restricted	not restricted	yes	yes	if required
	dried fungi (or parts thereof)					label	permit	required	required	not restricted	not restricted	yes	yes	if required
	dried invertebrates	no	no			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	other dried samples (hair, horn, feathers, …)	yes	yes			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	embedded microslides	no	no			label	permit	required	required	not restricted	not restricted	yes	yes	if required
	formalin fixed (4–10%, UN2209)	no	discretion	no	discretion	label	permit	required	required	not restricted	not restricted	yes	yes	if required
	formalin fixed (UN1198, flammable)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	if required

Table 3 (continued)

Mode of transportation	Type of sample / specimen & preservation method		Veterinary		Phytosanitation		CITES listed species		Customs declaration		IATA		Shipping docs specifies		
			health certificate	check border inspection post	health certificate	check border inspection post	among CITES institutes	one/none CITES instute	country of origin	value of goods	regulated	A180	preservation methods	protection status	include import licence
	alcohol preserved	ethanol absolut (UN1170)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	if required
		ethanol based buffers (UN1170)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	if required
		isoporpanol (UN1219)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	if required
		alcohols *nos* (UN1987)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	if required
checked luggage	fresh (plant/animal tissue/blood)		yes	yes			label	permit	available by boarding information	required	yes	restricted			if required
	alive (plant/animal tissue/blood)		yes	prohibited			label	permit		required	yes	prohibited			
	dried plants (or parts thereof)						label	permit		required	not restricted	not restricted	yes	yes	
	dried fungi (or parts thereof)						label	permit		required	not restricted	not restricted	yes	yes	
	dried invertebrates		no	no			label	permit		required	not restricted	not restricted	yes	yes	
	other dried samples (hair, horn, feathers, …)		yes	yes			label	permit		required	not restricted	not restricted	yes	yes	
	embedded microslides		no	no			label	permit		required	not restricted	not restricted	yes	yes	
	formalin fixed (4–10%, UN2209)		no	discretion	no	discretion	label	permit		required	not restricted	not restricted	yes	yes	
	formalin fixed (UN1198, flammable)		no	discretion	no	discretion	label	permit		required	yes	discretion	yes	yes	
	alcohol preserved	ethanol absolut (UN1170)	no	discretion	no	discretion	label	permit		required	yes	discretion	yes	yes	
		ethanol based buffers (UN1170)	no	discretion	no	discretion	label	permit		required	yes	discretion	yes	yes	
		isoporpanol (UN1219)	no	discretion	no	discretion	label	permit		required	yes	discretion	yes	yes	
		alcohols *nos* (UN1987)	no	discretion	no	discretion	label	permit		required	yes	discretion	yes	yes	
air cargo	fresh (plant/animal tissue/blood)		yes	yes			label	permit	required	required	yes	restricted			if required
	alive (plant/animal tissue/blood)		yes	yes			label	permit	required	required	yes	restricted			
	dried plants (or parts thereof)						label	permit	required	required	not restricted	not restricted	yes	yes	
	dried fungi (or parts thereof)						label	permit	required	required	not restricted	not restricted	yes	yes	
	dried invertebrates		no	no			label	permit	required	required	not restricted	not restricted	yes	yes	
	other dried samples (hair, horn, feathers, …)		yes	yes			label	permit	required	required	not restricted	not restricted	yes	yes	
	embedded microslides		no	no			label	permit	required	required	not restricted	not restricted	yes	yes	
	formalin fixed (4–10%, UN2209)		no	discretion	no	discretion	label	permit	required	required	not restricted	not restricted	yes	yes	
	formalin fixed (UN1198, flammable)		no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	
	alcohol preserved	ethanol absolut (UN1170)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	
		ethanol based buffers (UN1170)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	
		isoporpanol (UN1219)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	
		alcohols *nos* (UN1987)	no	discretion	no	discretion	label	permit	required	required	yes	exempted	yes	yes	

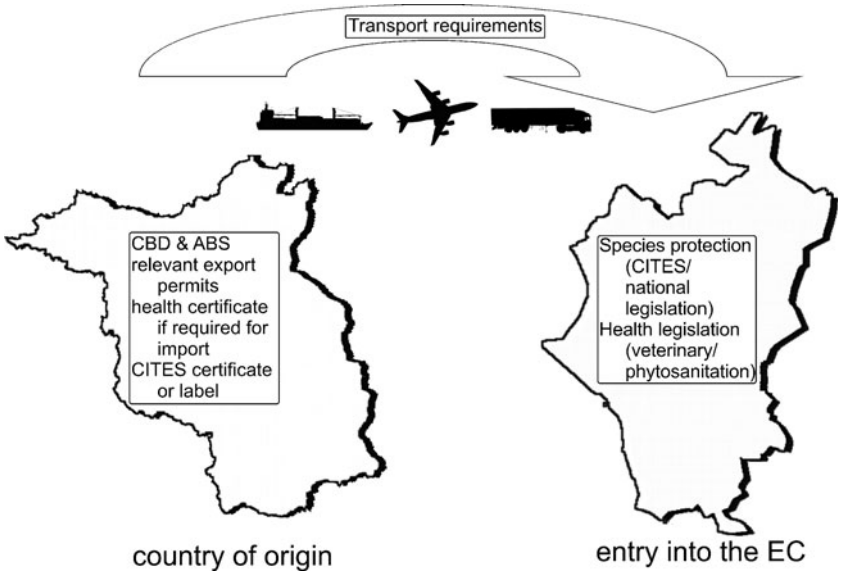

Fig. 2 Overview of regulations to be considered, in the country of origin (e. g. ABS, PIC, MAT, export permits), during transport (e. g. IATA), and for import (e. g. CITES and national legislation, health legislation)

Glossary

Table 4 Terms from the main text, explained in the glossary are proceeded and highlighted with "→" when first mentioned in the text

Abbreviation	Full term/description	URL	Relevant for
A180	(c. f. IATA Dangerous Goods Regulations 2012, p. 347–348)		
ABPs	Animal by-products		EC animal health legislation
ABS	Access and Benefit Sharing	http://abs.scnat.ch/	CBD, Nagoya Protocol
ADR	*Accord européen relative au transport international des marchandises Dangereuses par Route*	http://live.unece.org/trans/danger/publi/adr/adr_f.htm	Dangerous goods regulations
AND	*Accord européen relative au transport international des marchandises Dangereuses par voies de navigation intérieures*	http://live.unece.org/trans/danger/publi/adn/adn_e.htm	Dangerous goods regulations
BfN	*Bundesamt für Naturschutz*; the German Federal Agency for Nature Conservation	www.bfn.de	CITES, ABS, CBD
Biopiracy	A term used by countries or governments to claim illegal collecting activities that typically supposedly generate some money through patents or other		CBD, Nagoya Protocol
Birds directive	EC mechanism to protect birds in their habitat as a whole and as part of fauna and flora	http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm	EC, CITES
Cartagena protocol	Cartagena Protocol on Biosafety to the Convention on Biological Diversity; an international agreement which aims to ensure the safe handling, transport and use of living modified organisms resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health.	http://bch.cbd.int/protocol/	CBD
CBD	Convention on Biological Diversity	www.cbd.int	
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	www.cites.org	
COP	Conference of the Parties; the governing body of the CBD, and advances implementation of the CBD through the decisions it takes at its periodic meetings.		CBD

Table 4 (continued)

Abbreviation	Full term/description	URL	Relevant for
COSE	Certificate of Scientific Exchange (CITES) of the U.S. Fish and Wildlife Service	http://www.fws.gov/forms/3-200-39.pdf	US, CITES
Country of origin	The country from which the respective goods/ samples originated	http://en.wikipedia.org/wiki/ Country_of_origin. Note: for museum specimens, the country of origin is the country that holds the collection for the specimen in question	Customs
DFG	*Deutsche Forschungsgemeinschaft*	http://www.dfg.de	
DGR	Dangerous Goods Regulations		IATA
DO-G	German Ornithologists' Society	http://www.do-g.de/	
EC	European Community		
BGCI	European Consortium of Botanic Gardens	http://www.bgci.org/global/2245/	IPEN, phytosanitation
E-Decs	Electronic Declaration/(URL) generated from information when issuing electronic shipping labels using specific shipping software provided by commercial couriers		IATA, import of samples
EQ	Excepted Quantity		IATA
FAO	Food and Agricultural Organization	www.fao.org	phytosanitation
FFH-directive	Fauna-Flora-Habitats' Directive	http://ec.europa.eu/environment/ nature/legislation/habitatsdirective	EC, CITES
Genetic resource	A sample containing any DNA or RNA or derivates thereof		ABS, CBD, Nagoya Protocol
GfBS	*Gesellschaft für Biologische Systematik*	http://www.gfbs-home.de/	
GTI	Global Taxonomy Initiative	www.cbd.int/gti/	ABS, CBD, Nagoya Protocol
HazMats	Hazardous materials		IATA
Humboldt-ring	Humboldt-Ring *–Verbund deutscher Forschungsmuseen*	http://www.humboldt-ring.de/	
IATA	International Association of Air Transportation	www.iata.org	Dangerous goods regulations for air transport imposed by Airline
IBAMA	Brazilian Environmental Authority	www.ibama.gov.br	
ICAO	International Civil Aviation Organization	http://www2.icao.int/Home/default.aspx	UN Dangerous goods regulations for air transport
IPEN	International Plant Exchange Network: An online resource to demystify access and benefit sharing between botanic gardens around the world.	http://www.bgci.org/resources/ipen/	Plant material
IPPC	International Plant Protection Convention	http://www.fao.org/docrep/009/a0450e/ a0450e00.htm	Plant material
LMO	Living modified organisms		Cartagena Protocol
LQ	Limited Quantity		IATA
MAT	Mutually Agreed Terms		ABS, CBD
MSDS	Material Safety Data Sheet		IATA
MTA	Material Transfer Agreement		ABS
Nagoya protocol	The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity	www.cbd.int/abs/	ABS, CBD
NeFo	Network-Forum Biodiversity Research Germany	www.biodiversity.de	
NFP	National Focal Point (an authority or person dealing with all matters on a specific task, e. g., ABS)		Nagoya Protocol, ABS, GTI, CBD

Table 4 (continued)

Abbreviation	Full term/description	URL	Relevant for
NGO	Non-Governmental Organization		
Party, parties	Typically a country or territory, ratifying a treaty or international agreement		All
PBVO	*Pflanzenbeschauverordnung (*Plant Inspection Order*)*	http://www.gesetze-im-internet.de/bundesrecht/pflbeschauv_1989/gesamt.pdf	
PIC	Prior Informed Consent		ABS
SANCO	*Santé (*Health*) & Consommateurs (*Consumers*)* = Directorate General for Health and Consumer Protection of the European Commission/	http://ec.europa.eu/dgs/health_consumer/index_en.htm	EC animal health legislation
Schengen area of the EC	25 European countries signed the Schengen-Agreement to harmonize external border controls and reduce internal border controls		
Scientific authority	The Scientific Authority establishes in each country the specific rules and procedures	http://www.cites.org/eng/cop/08/doc/E-37.pdf	CITES
SPNHC	Society for the Preservation of Natural History Collections	http://www.spnhc.org/	
UN numbers	The United Nations Committee of Experts on the Transport of Dangerous Goods provides four-digit numbers that identify hazardous substances, and articles in the framework of international transport.	http://live.unece.org/trans/danger/danger.html	IATA
WISIA	*Wissenschaftliches Informationssystem zum Internationalen Artenschutz* (German only)	http://www.wisia.de/	CITES

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Appendices

Appendix A–summary of the guidelines, prepared during workshops

(1) http://www.biodiversity.de/index.php/de/netzwerk/themenschwerpunkte/1528-genehmigungen2011

Appendix B–contacts for national focal points (ABS)

(1) http://www.ABS.bfn.de/fileadmin/ABS/documents/nfp-ABS.pdf

(2) http://www.ABS.bfn.de/service_regelungen.html

(3) www.cbd.int/abs/

(4) www.ABS.bfn.de

Appendix C–legal basis and laws regarding CITES and species protection as of 2011

(1) Federal Nature Conservation Act of 29 July 2009, Federal Law Gazette part I, p. 2542, in force since 03 March 2010

(2) Council Regulation (EC)No. 338/97 of 09 December 1996–Gazette of the EC No. L 61 p. 1, corrected in Gazette of the EC No L 100, p. 72 and L 298, p. 70, recently changed by Commission Regulation No 709/2010 of 22 July 2010, Gazette of the EC L 212 of 12 August 2010, pp. 1

(3) Commission Regulation (EC)No. 865/2006 of 04.05.2006–Gazette of the EC No. L 166 of 19 June 2006, in force since 9 July 2006, recently changed by Commission regulation No. 100/2008 of 04 February 2008–Gazette of the EC No L 31 of 05 February 2006–in force since 25 February 2008

(4) Commission Regulation (EC)No. 997/2010 of 05 November 2010–Suspending the introduction into the Union of specimens of certain species of wild fauna and flora–Gazette of the EC No. L 290 of 06 November 2010, p. 1

(5) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) of 03 March 1973, Text published in the Act on CITES of 22 March 1975 (Federal Law Gazette II, p. 773), Appendixes I-III CITES worked into the Annexes A-D of the Council Regulation (EC) 338/97 in the latest valid release
(6) EC Birds Directive–Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds–Gazette of the EC No L 20 of 26 January 2010, p. 7–in force since 15 February 2010
(7) FFH-Directive–Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora–Gazette of the EC No. L 206 of 22 July 1992, p. 7, recently changed by Council Directive 2006/105/EC of 20 November 2006 (within the scope of the accession of Bulgaria and Romania into the EC of 01 January 2007)–Gazette of the EC No. L 363 of 20 December 2006, pp. 377
(8) European Commission–Wildlife-Trade in the EU (http://www.eu-wildlifetrade.org/pdf/en/2_national_legislation_en.pdf), last access 30 August 2011

Appendix D–useful internet links for CITES permits

(1) www.CITES.bfn.de
(2) www.wisia.de
(3) www.CITES.org
(4) www.cites.org/common/reg/e_si.html (list with all CITES institutes)
(5) www.eu-wildlifetrade.org

Appendix E

(1) (Council Regulation (EC) No 338/97) introduces an additional category D for species having "monitoring status".
(2) Directive 2009/147/EC of the European Parliament and the Council on the conservation of wild birds
(3) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

Appendix F–regulations for phytosanitation

(1) *Pflanzenbeschauverordnung* (PBVO) and its Appendices are relevant in Germany
(2) Restricted species for seeds' import: http://pflanzengesundheit.jki.bund.de/index.php?menuid=72 under "Samen".
(3) Directive 2008/61/EG Appendix 3 of the PBVO *Pflanzenbeschauverordnung*; http://pflanzengesundheit.jki.bund.de/dokumente/upload/e5d08_pbvo-txt-kons.pdf regulates import of prohibited taxa
(4) Identification of responsible institution through the JKI website with links to institutions in most countries of the world: http://pflanzengesundheit.jki.bund.de/index.php?menuid=28m
(5) A list of the responsible institutions in Germany is available on the website of the Julius-Kühn-Institut (JKI) at http://pflanzengesundheit.jki.bund.de/index.php?menuid=2&reporeid=26
(6) A list of taxa and origins' of seeds needing plant health certificates can be found at http://pflanzengesundheit.jki.bund.de/index.php?menuid=72 under "*Samen*".

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