

The international transportation of zoo animals: conserving biological diversity and protecting animal welfare

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Summary

Issues pertaining to the long distance transportation of animals are examined according to the aspirations of the world's zoo community. Guidance comes from the World Association of Zoos and Aquariums (WAZA), the civil society organisation that provides 'leadership and support for zoos, aquariums and partner organisations of the world in animal care and welfare, conservation of biodiversity, environmental education and global sustainability'. The authors describe why it is necessary to transport zoo animals over long distances and how animal welfare can be protected during the process. Transportation of animals among zoos is essential for the cooperative breeding programmes undertaken for the *ex situ* conservation of wildlife with the help of WAZA studbooks. The challenge is to satisfy the entwined ethical imperatives of safeguarding animal welfare and protecting biodiversity.

Keywords

Animal, Animal welfare, Biodiversity, Long distance, Transportation, Welfare, Zoo, Zoo animal.

Il trasporto internazionale degli animali degli zoo: conservazione della biodiversità e protezione del benessere animale

Riassunto

Le tematiche sul trasporto a lunga distanza di animali vengono esaminate in rapporto alle aspettative della comunità mondiale degli zoo. Il controllo è affidato all'Associazione Mondiale degli Zoo ed Acquari (WAZA), un'organizzazione non governativa che si occupa della 'direzione e sostegno di zoo, acquari e organizzazioni mondiali associate per la cura e il benessere degli animali, tutela delle biodiversità, educazione ambientale e sostenibilità globale'. Lo studio riguarda il perché si crea la necessità di trasportare gli animali degli zoo per lunghe distanze e come il benessere animale può essere protetto durante questo processo. Lo spostamento degli animali tra gli zoo è essenziale per i programmi di riproduzione comuni intrapresi per la conservazione ex situ della fauna selvatica con l'aiuto dei libri genealogici della WAZA. La sfida è riuscire a soddisfare l'imperativo etico di proteggere il benessere animale e tutelare la biodiversità.

Parole chiave

Animali, Animali degli zoo, Benessere, Benessere animale, Biodiversità, Lunga distanza, Trasporto, Zoo.

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Introduction

It was said in 1964 that 'the zoological garden of today has progressed far beyond the scope and status of a mere menagerie' (4). Modern and responsive zoos have been transformed into 'urban refuges of wildlife' providing opportunities for education, conservation and research, perhaps becoming a necessity for urban dwellers who may have no contact with wild creatures but who may 'ultimately shape' future policies for the conservation of global biodiversity (3). Zoos now make a valuable contribution to the conservation of animal species which is made increasingly necessary by factors that reduce or destroy natural habitats, including climate change (7, 10, 11). For example, over 600 mammal species are considered as globally threatened, yet in 1990 only 20 500 animals from 140 threatened species were held in zoos (7). Conservation goals require that animals are transported over long distances and the challenge is to transport them in a manner that caters for their welfare.

The provenance of this paper is the Vienna Zoo, the *Tiergarten Schönbrunn*, which was established in 1752. It has the distinction of being the world's oldest zoo and is living evidence of the transformation of zoos into institutions that are crucial for the protection of biodiversity through what they do and what they champion. The paper speaks for the interests of the zoo community in the long distance transportation of animals and draws heavily upon the published wisdom of the World Association of Zoos and Aquariums (WAZA), the civil society organisation that provides 'leadership and support for zoos, aquariums and partner organisations of the world in animal care and welfare, conservation of biodiversity, environmental education and global sustainability' (11). In doing so, it celebrates the efforts made by the late Peter Linhart on the practicalities of transporting zoo animals and managing the entwined needs of conserving biodiversity and protecting animal welfare. The paper describes the world circumstances that make a case for the long distance transportation of zoo animals and the

practical measures taken to protect the welfare of animals during the process.

Why zoo animals undergo long distance transportation

Reasons for transporting zoo animals over long distances are tied to the aspirations and the real achievements of modern zoos in conserving the world's biodiversity. These aspirations and the strategies that accompany them are explained comprehensively in the 2005 World Zoo and Aquarium Conservation Strategy (Building a Future for Wildlife) or the WZACS (11), which brings up to date the World Zoo Conservation Strategy of 1993 (14). The WZACS strategy seeks to answer the worries and questions about conservation and animal welfare and whether or not zoos should be supported. It extends earlier contemplations (8) about the balance between animal conservation and animal welfare so that common ground can be found and mutually acceptable pathways to progress can be mapped out. More than 600 million people visit the 200 or so zoos covered by WAZA each year. The opportunity for raising awareness about wild animals through the enjoyment of their unique nature in pleasurable and accessible surroundings is unparalleled.

In the words of the WZACS strategy, 'only zoos, aquariums and botanic gardens can operate across the whole spectrum of conservation activities, from *ex situ* breeding of threatened species, research, public education, training and influencing and advocacy, through to *in situ* support of species, populations and their habitats; they uniquely have a massive "captive audience" of visitors whose knowledge, understanding, attitude, behaviour and involvement can all be positively influenced and harnessed. They have a huge resource of technical skills and dedicated people. As habitats shrink and collection-managed populations grow, the definition of what is a zoo, what is a botanic garden, what is a reserve, and who is a collection-based conservationist, who is a field-based conservationist, will inevitably blur.

Zoos, aquariums and botanic gardens have an opportunity to establish themselves as models of “integrated conservation” and the means of achieving this in a collective fashion for zoos and aquariums is through the WZACS’.

World Association of Zoos and Aquariums

WAZA has authority as the international body representing the views of the world’s zoos and aquariums in international forums such as the World Conservation Union (the IUCN, the International Union for the Conservation of Nature) (www.iucn.org) and the Conferences of Parties to global conventions such as the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) (www.cites.org/), the Convention on Biological Diversity (CBD) (www.cbd.int/default.shtml) and the Convention on Migratory Species (CMS) (www.cms.int). WAZA succeeded the previous International Union of Directors of Zoological Gardens (*Internationale Union der Direktoren Zoologischer Gärten* [IUDZG]) in 2000. WAZA’s mission is ‘to guide, encourage and support the zoos, aquariums, and like-minded organisations of the world in animal care and welfare, environmental education and global conservation’.

WAZA’s code of ethics and animal welfare is relevant to the long distance transportation of zoo animals. This code is publicly available (13) and states that:

- all animals are to be treated with the utmost care and their welfare should be paramount all times
- any legislated codes for animal welfare should be regarded as minimum standards
- appropriate animal husbandry practices must be in place with sound veterinary care available
- when an animal has no reasonable quality of life, it should be euthanased quickly and without suffering.

The WAZA code contains statements on the use of animals in zoo and aquariums, exhibit standards, the acquisition and transfer of animals, contraception, euthanasia, mutilation, research using zoo-based animals, release-to-

the-wild programmes, deaths of animals whilst in care and, finally, external wild animal welfare issues. This last topic contains matters pertaining to trade and the taking of animals from the wild and which have direct relevance to animal transportation.

World Association of Zoos and Aquariums and the World Conservation Union

The connection between WAZA and the IUCN is important. WAZA is the peak voice of the zoo community in the IUCN and helps to turn the platform of the IUCN into reality. As for the IUCN, it is the ‘world’s largest and most important conservation network and involves 83 states, 110 government agencies, over 800 non-governmental organisations and some 10 000 scientists and experts from 181 countries in a unique worldwide partnership’. Its role is ‘to influence, encourage and assist in conserving the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable’. The IUCN seeks to extend the understanding of the goods and services provide by nature, biodiversity and ecosystems. Its functions include the monitoring of the world’s species through the Red List of Threatened Species and support of the Millennium Ecosystem Assessment of the United Nations. The IUCN has helped over 75 countries to prepare and implement national conservation and biodiversity strategies. It has official status of observer at the United Nations General Assembly.

World Association of Zoos and Aquariums activities in *ex situ* and *in situ* conservation of wildlife

WAZA defines the responsibilities of the world’s zoos and aquariums in regard to the conservation of the diversity of global wildlife. It sets out the conditions which individual zoos, aquariums and their cooperative networks should satisfy in order to realise their full potential for *in situ* and *ex situ* conservation. To clarify, *ex situ* conservation requires the actual removal of biological resources, such as live animals, from the

original habitat or natural environment, whereas *in situ* conservation is a conservation method that attempts to preserve the integrity of genetic resources by conserving them within their original habitat or natural environment.

WAZA recognises the limitations of *ex situ* conservation. Preserving individual species in human care is unlikely to protect the world's biodiversity and must be coupled with the conservation of intact ecosystems if the earth's wildlife is to survive. WAZA aims to increase the number of zoos involved in habitat conservation and to make zoos the primary non-governmental field conservation organisations. Nonetheless, *ex situ* conservation remains important and requires the long distance transportation of animals. *Ex situ* breeding supports the release-to-the-wild programmes conducted by WAZA members.

WAZA activities in *ex situ* conservation include oversight of 182 international studbooks or registers of the breeding history of captive animals. These international studbooks apply to endangered and rare species and are co-ordinated by the Zoological Society of London. There are studbooks for regional breeding programmes as well and the ultimate result is coverage of more than 850 different species, families or classes of animal.

Co-operative breeding programmes at the regional or international level provide animals for public exhibition and education, research collections for furthering basic knowledge of animal biology and husbandry and reserves for wild populations. Accordingly, captive populations must be viable over the long term. This requires their management for demographic stability, health, and capacity for self-sustaining reproduction. Animals in cooperative breeding programmes are distributed among several institutions to lessen the risks of catastrophic loss and to create population sizes adequate for maintaining genetic diversity and heterozygosity and guarding against problems from founder effects and inbreeding depression (2).

Conservation breeding programmes are usually organised through regional associations, such as the American Zoo and Aquarium Association or the European Association of Zoos and Aquaria. The reason is that the exchange of animals between regions is expensive and transboundary animal diseases are an unavoidable consideration. Regional associations may go beyond collection of breeding records in regional studbooks and may have programmes for maintaining *ex situ* populations over the long term or using *in situ* populations for reintroducing animals into the wild. These programmes are take the form of Population Management Plans (PMPs) or species survival plans (SSPs) and are undertaken with assistance from Taxonomic Advisory Groups (TAGs), Scientific Advisory Groups (SAGs) and Conservation Action Partnerships (CAPs).

There have been successes. For instance, bearded vultures (*Gypaetus barbatus*) and Alpine ibex (*Capra ibex ibex*) can be found in the wild again in Europe. Waldrapp ibis (*Geronticus eremita*), addax (*Addax nasomaculatus*) and Mhorr gazelle (*Gazella dama mhorr*) are available in Africa. Black caimans (*Melanosuchus niger*) are back home in South America and the Przewalski horse (*Equus przewalski*) is grazing on the wild country again in Mongolia. The current worldwide population of European bison (*Bison bonasus*) originated from 35 animals and that of Przewalski horses (*Equus przewalski*) results from 39 animals that survived after the Second World War.

How long distance transportation is conducted with zoo animals

Every instance of zoo animal transport requires sound and detailed preparation and risk management which accounts for the training and skills of animal carers, the design and engineering of vehicles and vessels and the selection, preparation and nature of the zoo animals involved. Zoo animals are diverse and differ strikingly from domestic animals.

Domestication has resulted in genetic changes in the less than 20 species of domestic mammals (9). These changes have made them adapt to a captive environment and have reduced characteristics such as fight or flight behaviour, territoriality and dominance behaviour. The consequence is that the long distance transportation of zoo animals requires appropriate facilities, particularly crates and species-specific care. All other transport considerations are the same as those that apply to other types of animals.

Convention on International Trade in Endangered Species of Wild Fauna and Flora

A preliminary consideration in the long distance transportation of zoo animals is CITES and the preparation and certification of documents required by government authorities that administer this convention. CITES itself was established in 1975 to prevent international trade from threatening species with extinction. Unregulated trade in wildlife has become a major factor in the decline of many species of animals and plants. More than 150 countries are party to CITES and each member country controls the import and export of an agreed list of species that are endangered, or at risk of becoming endangered, due to inadequate controls over trade in these species or their products. CITES resources include a database administered by the World Conservation Monitoring Centre (WCMC) of the United Nations Environment Program, which contains information on 74 561 animals and 88 761 plants of conservation interest, as well as 94 070 sub-species, stocks or synonyms.

CITES establishes a worldwide system of controls on international trade in threatened wildlife and wildlife products by stipulating that government permits are required for such trade. CITES places species into three categories based on their conservation status and the risk from trade. Species in each category are listed in three appendices in the CITES. Appendix I contains species threatened with extinction and which may be affected by trade. Those of zoological interest include

apes, lemurs, the giant panda, many South American monkeys, great whales, cheetah, leopard, tiger, elephant, all species of rhinoceros, many birds of prey, cranes, pheasants, parrots, all sea turtles, some crocodiles and lizards, giant salamanders and some mussels. Appendix II contains species that, although not threatened with extinction now, might become so unless trade in these species is strictly controlled and monitored. CITES Appendix II also includes some non-threatened species, in order to prevent threatened species from being traded under the guise of non-threatened species that are similar in appearance. These are the so-called 'look-alike' species. Appendix III contains species that any CITES party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation and that requires the co-operation of other countries in the control of trade.

Unfortunately, many well-known air carriers with freighter operations refuse to transport CITES I species. This may result from a misconception that CITES I species always come from the wild and not from established captive breeding populations. The reality is that transporting CITES I species between breeding facilities makes programmes for re-introductions into the wild possible and that carriage of endangered species for conservation purposes can enhance the public image of airlines.

The process of transporting zoo animals over long distances

The first step is planning and ensuring the skills of all involved. Planning is facilitated by the Live Animal Regulations (LARs) of the International Air Transport Association (IATA) (5), which sets forth invaluable guidelines for the air transport of animals. This is available as a book or CD-Rom. Further sound information, particularly on hoof-stock, is available in the manual published by the Animal Transportation Association (1).

Professional partners with a long history of experience in special animal transport and with an eye to risk management should

perform the transport. These professionals will be very thorough in the questions they raise, which is essential for the successful transport of animals. Time must be taken to consider and verify beforehand the integrity of every single link in the transport chain. Specialised loading and unloading equipment must be available as illustrated in Figures 1, 2 and 3 which show an Indian rhinoceros (*Rhinoceros unicornis*) being unloaded from a truck at Vienna Zoo, a giant panda (*Ailuropoda melanoleuca*) being unloaded from an aircraft en route from China to Vienna and rockhopper penguins (*Eudyptes chrysocome*) after unloading from an aircraft. The consequence of errors will be borne by the transported animal. For example, non-acceptance of a health certificate



Figure 1
Indian rhinoceros (*Rhinoceros unicornis*) being unloaded from a truck at the Vienna Zoo



Figure 2
A giant panda (*Ailuropoda melanoleuca*) being unloaded from an aircraft en route from China



Figure 3
Crated rockhopper penguins (*Eudyptes chrysocome*) after unloading from an aircraft

may require an immediate return trip from the country of destination. There should be no hesitation in postponing transport if the risk management process is incomplete or if new risks emerge.

The selection of transport crates and crate training is crucial in preparing zoo animals for long distance transport. The idea is to have animals accept the crate as a safe and secure refuge and to reduce the emotional impact of novelty during the transport process. Satisfactory crate training will reduce the risk of injury and lessen the stress of adaptation (6). Crate training and its beneficial consequences for animals could be extended to the transportation of animals other than zoo animals.

Experience from the Vienna Zoo indicates that breeding animals should be introduced to the shipping procedures at the earliest stage possible. Sufficient time should be taken to allow animals to become accustomed to crates. Patience is rewarded by a successful result and the removal of any need to use sedatives. A crate-trained Indian rhinoceros is shown leaving its crate and entering a new enclosure (Fig. 4). More than 80% of animal transports from the Vienna Zoo are accomplished without recourse to sedatives. The use of sedatives requires specialised veterinary knowledge and skills and is beyond the scope of this paper.



Figure 4
Indian rhinoceros (*Rhinoceros unicornis*) leaving a crate at its destination at the Vienna Zoo

Animals can make positive associations between crate training and transport and the results of transport. An example is the male cheetah (*Acinonyx jubatus*) at the Vienna Zoo, who recognised the prospect of breeding with a new mate whenever he sighted his transport crate. The result was instant boarding into the crate. Positive reinforcement by other means could be usefully applied to all sorts of animal transportation. IATA crate 72, which is suitable for bear and big cats, such as the cheetah, is shown in Figure 5.



Figure 5
Crate for bears and big cats such as the cheetah that meets container requirement 73 of the International Air Transport Association Live Animal Regulations

Comprehensive information on the crates suitable for different species of zoo animals is available at the WAZA's virtual zoo on the internet (12). The virtual zoo has active links to

fact sheets on zoo species that contain biological data and information on housing, care, feeding and transport. The transport section shows a photograph of the type of crate required for a particular species and has links to IATA and to national and international legislation. IATA crates suitable for giraffe (*Giraffa camelopardis*), pinnipeds such as the Californian sea lion (*Zalophus californianus*), canids, like the African wild dog (*Lycaon pictus*), non-human primates, such as the common marmoset (*Callithrix jacchus*) and flamingos, such as the greater flamingo (*Phoenicopterus roseus*), are shown in Figures 6, 7, 8, 9 and 10.



Figure 6
Crate suitable for the giraffe (*Giraffa camelopardis*) according to crate requirement 73 of the International Air Transport Association Live Animal Regulations



Figure 7
Crate suitable for pinnipeds according to crate requirement 76 of the International Air Transport Association Live Animal Regulations



Figure 8
Crate suitable for canids such as the African wild dog (*Lycaon pictus*) according to requirement 82 of the International Air Transport Association Live Animal Regulations



Figure 9
Crate suitable for non-human primates such as the common marmoset (*Callithrix jacchus*) according to requirement 31 of the International Air Transport Association Live Animal Regulations



Figure 10
Crate suitable for flamingos according to requirement 17 of the International Air Transport Association Live Animal Regulations

Information on transport crates for the cheetah is reproduced below as an example of the comprehensive information provided at WAZA's virtual zoo and provides a fitting conclusion to this treatment on the long distance transportation of zoo animals.

'Transport crates should be sufficiently large to meet legal requirements, sufficiently strong to prevent escape or damage to the crate and animal, and have an adequate number of handles. Basic design should allow free flow of air through multiple sides of the container. A double door design on each end of the crate should be used. The "inner" door on each end should have bars to contain the animal, and the "outer" door should consist of a thin panel of expanded metal that provides safety for the handlers. The doors on each end of the crate should travel vertically to facilitate animal transfer and contain a secure locking system. The crate should drain well, and absorbent bedding should be used to prevent the animal from being exposed to or lying in urine or excreta. The crate should be of a size that allows easy lifting, transport and movement through doorways.

The shipment should be organised in a way to minimise stress. The animal should have access to its transport crate for two weeks before shipment, preferably being fed within it. If an extended trip is anticipated, water and eventually food should be provided while the animal is in transit. Ideally, one of the animal's keepers should accompany it during transport, providing for its care and helping it adjust to the new environment.

For air transport, Container Note 72 of the IATA Live Animals Regulations should be followed'.

In memoriam

Peter Linhart passed away on 21 May 2007. This paper honours his significant contribution to the humane transportation of zoo animals and its benefits to the conservation of wildlife.

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