

Executive overview: welfare aspects of the long distance transportation of animals

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Summary

A compendium of papers brings together a range of perspectives on the long distance transportation of animals. The purpose is to assist in the strengthening of global public policies for the protection of animal health and welfare. The audience targeted is the wide range of people involved in shaping sound public policy. Papers cover the history of long distance transportation of animals, the viewpoints of the foremost civil society organisations involved in the long distance transport of animals, how various governments approach public policy on the subject, the implementation of quality management for the transportation of different species of animals in different situations, future directions for quality management, design and engineering of infrastructures, transport safety and animal welfare and the education and training necessary for the successful management of animal welfare during long distance transportation. A seamless connection between animal health and animal welfare is an absolute necessity given the critical importance of animal movements in the spread of infection and the devastation to animal and human welfare produced by infectious disease.

Keywords

Animal, Long distance, Monograph, Policy, Transportation, Welfare.

Panoramica sugli aspetti relativi al benessere animale nel trasporto a lunga distanza

Riassunto

Un compendio di studi che raccoglie una serie di considerazioni sul trasporto a lunga distanza di animali. L'intento è favorire il rafforzamento delle politiche mondiali a tutela del benessere animale ad uso di chi è coinvolto nell'attuazione di una politica valida ed adeguata. Gli articoli si occupano della storia del trasporto di animali a lunga distanza, dei vari punti di vista delle principali organizzazioni non governative coinvolte nel trasporto a lunga distanza di animali, l'approccio dei vari governi alla politica in materia, l'implementazione della gestione della qualità nel trasporto delle diverse specie di animali nelle differenti situazioni, le future indicazioni riguardanti la gestione di qualità, progettazione e realizzazione di infrastrutture, il trasporto sicuro di animali e il loro benessere nonché la formazione ed istruzione indispensabili per una gestione riuscita del benessere animale nei trasporti a lunga distanza. Una gestione congiunta della sanità animale e del benessere animale è un'assoluta necessità data l'importanza critica dello spostamento di animali per la diffusione di un'infezione e l'effetto devastante provocato dalle malattie infettive sia sul benessere degli animali sia sugli esseri umani.

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Parole chiave

Animale, Benessere, Lunga distanza, Monografia, Trasporto.

Introduction

This issue of *Veterinaria Italiana* covers aspects relating to the humane and considerate care of animals during long distance transport. It recognises the inherent risks involved and discusses planning and risk management, the training and skills of animal carers, the design and engineering of vehicles and vessels and the selection and preparation of animals that make it possible to mitigate risks and achieve good welfare outcomes for animals.

The issue comes at a juncture in the history of animal welfare where two critical factors coincide. Firstly, the traffic of animals transported over long distances is trending upwards. Secondly, the guidelines for the welfare of animals during long distance transport by land and sea published in the 2007 *Terrestrial Animal Health Code* of the World Organisation for Animal Health (Office International des Épizooties: OIE) (10), fill a previous gap in international leadership and provide a shared platform for progress. The strength of the OIE guidelines comes from their foundation upon the consolidated experience of animal transporters and the many governments that have been obliged to address the welfare of animals during long distance transportation.

Trade statistics prepared by the International Trade Centre and expressed in financial terms (6) show that the long distance transport of livestock and poultry increased by 40% between 2000 and 2005. The top 10% and 25% of exporting countries accounted for 83% and 96% of the US\$12.1 billion value of livestock and poultry exports recorded in 2005. The increase can be attributed, in great part, to the globalisation of trade and the rapidly growing demand for food of animal origin, particularly in developing countries. A direct link with the transition known as the livestock revolution (1, 7) can be proposed. Global production of meat and milk is projected to double by 2050 and the consequent impacts on land, atmosphere,

climate, water, biodiversity and animals, including their welfare, are discernible hazards requiring judicious and timely attention (7).

Animal populations and the movement of animals will increase as part of the livestock revolution. These two factors are of fundamental and undeniable importance in the emergence, propagation and spread of infectious disease. Recent history demonstrates their action in spreading diseases with either an explosive impact, such as avian influenza and equine influenza, or an insidious impact, such as tuberculosis and paratuberculosis.

It is difficult to disentangle the possible animal welfare, animal disease and environmental impacts of the growing livestock sector and the accompanying increases in long distance transport of animals. For this reason, veterinary public health can provide for a meeting of minds on the suite of animal problems associated with the livestock revolution and for an inclusive and informed approach to them all. 'Veterinary public health' has been described as 'the sum of all contributions to the physical, mental and social well-being of humans through an understanding and application of veterinary science' (9). Furthermore, a consideration of the interacting triad of animals, their pathogens and the environment lies at the core of veterinary public health. Accordingly, *Veterinaria Italiana* with its leitmotif of veterinary public health is a uniquely placed international journal for a keynote treatment of the welfare aspects of the long distance transportation of animals.

The export of live poultry and livestock does not describe the full scale of long distance transportation of animals and the associated challenge of animal welfare and disease. Poultry and livestock can be transported over long distances within countries and the total number of transported animals expands greatly when animals for companionship, sport and recreation, display, education and study are included. As a consequence, the present compilation of papers covers the general issue of animal welfare during long distance transportation. It does not set out to be a compendium of scientific knowledge on

the welfare of transported animals, which is amply covered elsewhere (2, 4, 5). Instead, it seeks to explore the implementation of an evidence-based approach to animal welfare that builds on the OIE guidelines and which is framed around the methodologies of quality management and risk management.

Papers in the present compilation have been contributed from civil society organisations, governments, academia and organisations involved in research, development, teaching, training and outreach. They reflect the particular perspective on animal transportation possessed by the authors. The persistent theme is the application of foresight, the selection and preparation of animals, the appropriate infrastructure and the responsibility of people throughout the chain for the welfare of animals. The papers follow a deliberate sequence of eight groupings that cover the following topics:

- the history of long distance transportation of animals
- viewpoints of the foremost civil society organisations involved in long distance transport of animals
- descriptions of how various governments approach public policy on the subject
- the implementation of quality management for the transportation of different species of animals in different situations
- future directions for quality management of the long distance transportation of animals
- the design and engineering of the infrastructure for the long distance transportation of animals together with the proper selection of animals to be transported and also prevailing conditions and the species-specific needs of animals
- transport safety and animal welfare
- education and training for the competence required for successful management of animal welfare during long distance transportation.

History

Jean Blancou and Ian Parsonson provide a historical perspective on animal transportation and is based on the thesis that insight into

contemporary times and the future course of the livestock revolution is aided by an understanding of past events. Interestingly, previous geographic, social and economic transitions were associated with the movement and transportation of animals on a relatively large scale and over relatively long distances. The first transition occurred in the Mediterranean world during antiquity and extended to the whole of Europe during the Middle Ages. Subsequent transitions were associated with European expansions to the New World and then to Asia and the Pacific. These animal movements do not include the traditional nomadic husbandry of animals.

The views of civil society organisations

Four chapters describe the interests of the civil society organisations (CSOs) concerned with long distance transportation and are vital to a comprehensive view of the subject. CSOs have become increasingly important in the delivery of information and services and the implementation of programmes on the world scene (8).

The first chapter in the group comes from the Animal (Air) Transportation Association (AATA), a trade association that has been involved for over 30 years in developing standards and procedures for the movement of all types of animals and establishing accreditation schemes for the competencies required. It is a captivating eyewitness history of the modern era of animal transportation and provides links to the definitive AATA Manual for the Transportation of Animals, the authoritative *Live Animals Manual* of the International Air Transportation Association (IATA) and other educational material.

The second paper sets out the position of the International Federation of Agriculture Producers, a group concerned with the sustained production of food. This paper calls for a sober evaluation of the economic, scientific and practical dimensions of the long distance transportation of animals when establishing international rules. The aim is an infrastructure for the long distance

transportation throughout the world that is respectful of animal welfare and which results from awareness raising, a risk-based approach, education, product labelling, proper slaughterhouse capacity, attention to animal health and sound standards and rules.

The third paper is from 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 is keyed to the efforts of the World Association of Zoos and Aquariums (WAZA), the CSO 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'. 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 paper is a tribute to the late Peter Linhart of the *Tiergarten Schönbrunn* and recognises his practical efforts in reconciling the ethical imperatives of protecting animal welfare and protecting biodiversity.

The final paper in the group comes from the World Society for the Protection of Animals (WSPA) and presents the viewpoint of CSOs or non-governmental organisations (NGOs) concerned with animal welfare. The guiding principle is that the potential for poor animal welfare increases with the distance and time of travel. This idea is summed up in the useful notion of welfare potential and implies risk management. Thus, farm animals should be slaughtered as close to their farm of origin as possible and the trade in live animals for slaughter should be replaced by trade in meat only. The challenge for reform in long distance transportation of animals is to raise community awareness about the issue without invoking the psychological phenomenon of cognitive dissonance, which has the

paradoxical effect of reinforcing adverse behaviour.

The development of public policy for the long distance transportation of animals

Five papers provide case studies on how government agencies seek to facilitate the development of public policies for the long distance transportation of all species of animals. There is a noteworthy commonality in approach and the issues to be addressed. Differences arise from the need to respond to differing conditions.

The first paper discusses the model of risk assessment proposed for animal welfare by the European Commission as a salutary example of how to package scientific information for evidence-based policy that seeks to satisfy the interests of all parties. European Union (EU) policy has the twin objective of reducing long distance transportation as far as possible and upgrading standards for transported animals. Economic impacts are evaluated as part of the policy process and proper animal welfare standards can actually deliver direct and indirect economic advantages. Widespread awareness of policy and the monitoring of policy goals are crucial. A strong legislative framework is likely to remain the best option for the coming years to ensure that the welfare of animals exceeds a minimum.

A paper from the European Food Safety Agency describes its activities and the activities of the previous Scientific Committee on Animal Health and Animal Welfare (SCAHAW). An important background document is the Treaty of Amsterdam which obliges full regard to animal welfare when formulating and implementing EU legislation. Examples of the impact of scientific evidence on EU legislation are provided. The scientific evidence is summarised in the SCAHAW report on animal welfare aspects of the transport of horses, cattle pigs and sheep in 2002 (2) and the EFSA report of 2004 on the animal welfare aspects of poultry, deer, rabbits, dogs, cats, fish and exotic animals (4).

The Canadian view on public policy and the long distance transportation of animals describes how government regulators face numerous challenges when the following are combined: economic necessities (real and perceived), societal expectations on how animals should be treated, scientific research into the needs of various animal species and daily transport practices in the 'real world'. In Canada, a recipe to blend regulatory intervention with voluntary, industry-derived standards is the approach of choice for promoting economic competitiveness, appeasing animal welfare interest groups, satisfying industry lobbying organisations and meeting the needs of animals.

Australia's modus operandi for public policy on the long distance transport of animals is shaped by the Australian Animal Welfare Strategy, which sets out a broad and inclusive forum for consultation and cooperation between every interest group and with the necessary input from science. A risk-based approach is sought and is implemented through a combination of codes of practice, appropriate transport standards, quality assurance programmes and the enforcement of laws and regulations. Recognition of the responsibilities shared between owners and service providers along the transport chain is crucial.

The overview on the transportation of livestock in South America emphasises the scientific reports produced in Chile. These cover aspects such as journey distances covered, stocking densities used, general handling and the impact on blood variables that are related to both stress and meat quality. The author, Carmen Gallo of the Universidad Austral de Chile, describes how results of research are being transferred through talks, training courses and written material to producers, transporters and slaughterhouse personnel. Good outcomes can be achieved when information from more developed countries is complemented with locally derived information and government regulations are adapted to specific conditions in each country.

Quality management and the long distance transportation of various species of animals

A series of papers on quality management links the development of public policy to the management required for good welfare outcomes. Quality management measures are used for safety in aviation and other forms of transport and are highly effective in the management of food safety. The series of papers in this section illustrate how quality management can be applied to animal welfare. They cover farm animals, laboratory animals (including non-human primates) and performance horses.

John Barnett and co-workers from Australia's Animal Welfare Centre describe the development of an animal welfare component of a quality assurance (QA) programme for the land transport of livestock in Australia that covers the entire the transport chain. The programme is contained within three documents. These are a Standards Manual, a Working Document and a document on Background Information. Strategies for implementation of QA in the industry have also been developed. The welfare standards have been incorporated into the transport industry's general QA programme. The full impact of QA programmes will be fully appreciated when their ability to deliver comprehensive benefits and continual improvements in animal welfare has been evaluated.

Steven Leary of Washington University in St Louis describes how increased collaboration between investigators at different institutions has increased the number of laboratory animals being transported and how the current system of laws and regulations governing animal shipments are inconsistent. At the same time, government agencies with oversight often have areas of overlapping regulatory management and there is lack of industry-wide shipping standards and good practices that contributes to the shipper's confusion. A possible solution is the establishment of independent, industry-regulated good

practices for animal transport, similar to those used in laboratories for experimental design, i.e. good laboratory practice or 'GLP'). These good practices could be based on the existing IATA *Live Animals Regulations*, with contributions made by representatives of the specialties involved. Quality management could be improved if institutions were to designate a single point of contact to follow each shipment from departure to arrival.

David Elmore of Charles River Laboratories in San Diego describes the unique challenges posed in the transportation of non-human primates that arise from the characteristics of these animals. These unique challenges include the impact of public perception of non-human primates as cargo, the maintenance of biosecurity, the safety of both non-human primate and public contacts, meeting the vital husbandry needs of varying species of non-human primates and compliance with numerous regulatory agencies, which may have overlapping responsibilities. The discussion focuses on these challenges as they intersect with the legal international transportation of non-human primates for scientific use.

Des Leadon of the Irish Equine Centre describes the responsibilities of veterinary clinicians in preventing the spread of disease by transported horses and managing the welfare risks inherent in the long distance transportation of horses. The effects of transport on the illnesses and performance of horses is outlined.

Future directions for quality management in the long distance transportation of animals

Current best practice for the quality management of animals during long distance transportation distils from the long experience of transporters and implies a process of dynamic learning and experience. Change is inevitable and three papers explore the possible future directions for enhanced quality management that can come from refinements

to concepts, insightful risk management and technical innovation.

The first paper in the group is presented by editors, David Adams and Peter Thornber. It deals with a miscellany of matters and advances the epidemiological concept of the risk factor to explore mechanisms that operate in animals for the maintenance of physiological stability. The troubled term 'welfare' is revisited with a view to progress. It is proposed that animal welfare embraces animal well-being, the French *bien-être*, and good animal husbandry, the French *bien-traitance*. Welfare is regarded as part of a continuum from total well-being through grades of health to frank disease and the moribund state. This means that surveillance and management for welfare should also extend to infectious disease. To do otherwise would be unsafe for animals and people and can be regarded as morally unacceptable. The paper culminates on the thermal physiology of cattle to illustrate how the broad body of biological knowledge can inform *bien-traitance*.

Peter Stinson of Australia's LiveCorp describes the evolving innovation of quality assurance for animal welfare in Australia's livestock export industry. The initial form was an accreditation scheme containing standards and auditing, in addition to training requirements. Two major incidents in livestock export demonstrated that managing risks to animal welfare during long distance transportation is not achieved through standards alone and that formal and rigorous risk management is necessary. Standards associated with formal risk management make a potent combination against welfare risks, such as heat stress and disease, and also against commercial risks. The system envisaged is described and the need to ensure its full ownership is emphasised. Full implementation of formal risk management has been delayed in reaction to a public incident when authority was transferred to government regulators and standards were tightened.

Paolo Dalla Villa and colleagues from the *Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise 'G. Caporale'* (IZS A&M) in Teramo, Italy, and the European Union Joint Research

Centre (JRC) describe the innovation of Web-based geographic information systems (GIS) technology as a tool for quality management that can be used to monitor the actual state of transported animals. This technology promises major progress since behavioural and environmental parameters can be monitored and registered in real-time. The application is to the management and control of the transport environment and the conduct of transport personnel. The IZS A&M and JRC are conducting a project to prove the feasibility of a navigation system for long road journeys as referred to in European Commission Regulation No. 1/2005 (3). Web-GIS technology can be used in a risk analysis system to minimise risks of poor welfare during animal transportation.

Design and engineering of infrastructures for the long distance transportation of animals

Good engineering design of assembly areas, loading and unloading facilities, vehicles, ships and aircraft is essential to ensure the welfare of animals during long distance transportation. Such design is not possible without insights into the physiology and behaviour of animals and should account for both the climate and the species-specific needs of animals. All papers show how suitable solutions to problems can be achieved and demonstrate how good intentions for animal welfare can be converted into concrete reality.

The first paper on engineering and design is presented by Malcolm Mitchell and Peter Kettlewell of the United Kingdom. It deals with ruminants, pigs and poultry and the range of concurrent potential stressors that can compromise welfare. The effects of these stressors can be systematically mitigated by improvements in vehicle design and engineering that match environmental conditions with the biological requirement of the animals. Results of research around the thermal conditions on commercial transport vehicles, thermal comfort zones for different

species, heat and moisture loads requiring dissipation on vehicles and thermodynamic characteristics of animal transport vehicles that affect the design of effective ventilation systems are described. These results provide a sound basis for improved vehicle design and the range of public policy measures that can optimise the welfare of animals during long distance transportation.

The second paper comes from northern Australia. John Lapworth outlines the design of road vehicles for cattle in tropical and sub-Mediterranean climates. Specialised vehicles known as road trains, which traverse long distances in the remoter parts of Australia, are described. The starting point for design is safety for both people and animals and the need to preserve transport infrastructures, such as roads and bridges. Details are given of the design of vehicles and loading facilities. Loading and unloading ramps can be a major source of stress for cattle and standardised heights have been adopted in Australia.

The third paper in the engineering and design set comes from Carolyn Stull of the University of California and deals with the transportation of a problematic species, the horse. Horses are problematic because they are slaughtered for human consumption and, at the same time, have iconic status as animals for recreational activities and companionship. The paper explores the scientific studies that underpin the engineering and performance-based standards employed for the transportation of slaughter horses in the United States. The types of vehicles, characteristics of slaughter horse candidates, types of injuries during transport, duration of transit, stocking densities and other behavioural and physiological indices during long-distance road transport have come under study. So too have the physiological responses of horses travelling long distances in vans while cross-tied by their halters in individual stalls. These results are described in this contribution.

The last paper in the group on engineering and design set deals with holding yards, loading ramps and handling facilities for the transport of livestock and is written by Temple Grandin of Colorado State University who has inspired

and edited a major textbook on the handling and transport of animals (5). The paper contains detailed information with excellent illustrations on facility design for both intensively and extensively raised livestock and emphasises the need for appropriate facilities for handling extensively raised animals unaccustomed to close contact with people. The first message is that non-slip flooring in handling facilities is essential for all livestock. The final message is that the maintenance of high standards of animal welfare requires the training of employees to handle animals using methods to reduce stress; conducting weekly auditing of handling using an objective, numerical scoring system to maintain high welfare standards is advised.

Transport safety and the welfare of animals

The welfare of animals during long distance transport can be sustained only if the means of transport have the design and engineering to meet two needs. The first need is safety for both people and animals. The second is the capacity to meet the physiological and behavioural requirements of animals. All other measures to protect animal welfare will fail in the absence of sound risk management for safety. It is surprising that the safety aspects of animal transportation have received such little attention in the published literature. Papers on sea transport and land transport contain ideas that apply throughout the world.

The Australian Marine Safety Agency outlines the principles underlying the design standards regulating the vessels used for the sea transport of livestock from Australia. These principles are mindful of the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL). They also recognise that the protection of animal welfare is impossible in the absence of a combination of sound risk management for safety and the appropriate infrastructure on ships. A history of the development of the regulations is given and is

followed by a description of the principles employed for their development.

A pioneering paper on transport safety is presented by Jennifer Woods and Temple Grandin who describe investigations of commercial livestock truck accidents in Canada and the United States. Forensic analysis points to driver fatigue as a major cause of accidents. Benefits could result if epidemiological studies followed the example of this pioneering study and were performed elsewhere in the world.

Training, education and outreach for the long distance transportation of animals

The appropriate endnote is training, education and outreach for all involved in the animal transport chain as the essential key to either progress or simple maintenance of the status quo. Two papers cover training for sea transport and road transport.

Rosanne Ransley describes the training courses delivered by Australia's LiveCorp, a company that provides quality assurance and programmes for continuous improvement to livestock exporters, particularly for sea transport. LiveCorp commenced in 1998 with animal welfare as part of its mission and its initial training course for cattle stockmen has expanded to include sheep and goat stockmen and dockworkers. LiveCorp's courses are in continued demand from the live export industry and the Australian Quarantine Inspection Service. Standards for Australia's livestock export industry have been strengthened following two high-profile voyages. Standards now require that exporters prepare a consignment risk management plan for each voyage to the Middle East and apply a predictive heat stress model. LiveCorp provides training in the use of the predictive model and preparation of the risk management plans.

Karen Schwartzkopf-Genswein and her colleagues deal with land transport and describe the recently developed Certified Livestock Transporter (CLT) training

programme in Canada. This programme is designed to ensure that livestock transporters are educated and have access to up-to-date information regarding the humane handling of animals. The overview of the CLT includes examples from the main training manual and species-specific modules and discusses the

relationship between education and improved animal welfare and proposes possible future directions. Other possible users can modify the examples provided to develop new education and training programmes relevant to their geographic locations and livestock industries.

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