Development and challenges of wildlife husbandry: concluding remarks

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Summary: The author summarises the other articles contained in Vol. 15 (1), March 1996, of the Scientific and Technical Review of the Office International des Epizooties. Articles cover the following subjects: care and management of reptiles, amphibians, birds, ratites, carnivores, suids, camelids and cervids; and the health consequences of keeping these species in captivity. Housing, feeding and management are often less than perfect, and the special requirements of particular animals may not be understood. Constant vigilance is necessary to avert diseases. There is scope for further research on the diseases of specific animals, and on the validity in wildlife of diagnostic tests developed for domestic animals.

KEYWORDS: Diseases – Husbandry – Management – Wild animals – Zoo animals.

INTRODUCTION

Zoos annually attract the public in numbers which surpass the figure for spectators at all professional sporting events combined. Great strides have been made in the past century to develop more appropriate facilities for wild animals in zoos. Behavioural enrichment has come of age over the past two decades, and even more attention must be paid to this aspect of wildlife husbandry in the future. Zoos are also set to become more involved in the conservation of wild animals in their native habitat.

The articles presented in the first section of this book provide an overview of the principles of care and management of a few groups of animals maintained in captivity. The selected groups provide examples of the state of captive husbandry which may influence (i.e. inhibit or favour) the occurrence of infectious and parasitic diseases. Authors were asked to consider a list of questions formulated by the editor: the authors of the chapter on reptiles and amphibians chose to use these questions as topic headings, while other authors chose a more narrative form.

Overview

The overview provides an historical perspective of wild animals in captivity, followed by a discussion of stress as it relates to husbandry and the ‘nidus’ concept of disease, describing the challenges which result from the international movement of wild animals.

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Reptiles and amphibians

Captive reptiles probably have no diseases which are not found in their free-ranging counterparts. Being ectothermic, reptiles are particularly susceptible to husbandry practices which fail to provide minimum control of the ambient temperature. Prolonged anorexia may be caused by ambient environmental temperatures which preclude digestive enzyme function. The virus diseases of reptiles are poorly understood, but poorly-planned national and international movement of reptiles – together with the combining of different reptile taxa – may contribute to the development of epizootics. Salmonellosis and amoebic dysentery are the most important zoonoses which may be contracted from reptiles and amphibians.

Birds

Over 8,000 species of birds inhabit the world and are found in every ecosystem, including the aquatic. Birds provide a prime example of the nidus concept, as various taxa have evolved with groups of diseases which are relatively harmless to one population but may be devastating to other taxa. Herpesvirus and poxvirus infections are host-specific, and failure to appreciate this may be devastating when aviculturists place unrelated birds in juxtaposition to one another. The majority of bird species have been maintained in captivity at one time or another. Birds are probably the most popular pet species throughout the world. The bird fauna in many parts of the world have been heavily exploited to the detriment of free-ranging populations. Much has been learned about feeding, housing and behavioural enrichment, but only a few species have been studied scientifically to determine precise nutritional requirements or susceptibility to specific infectious and parasitic diseases.

Ratites

Ratites are found in Africa, South America and Australia, and have been kept in private and public avian collections since Antiquity. Over a hundred years ago, the farming of ostriches commenced in present-day South Africa, and recently many other countries have become involved in raising ratite species for meat, leather, oil and feathers. Husbandry practices must include restraint facilities, as some ratite species are capable of killing handlers unless adequate precautions are taken.

Carnivores

Humans have always feared or been fascinated by the large carnivores as symbols of might and power or as potential predators. Although sharing many anatomical and physiological characteristics, the Canidae and Felidae families each host a group of diseases unique to the family, and there is variable susceptibility to these diseases in other families. Wild carnivores serve as reservoir hosts for rabies, perhaps the most feared zoonosis in the world. Biotechnology has been employed to develop oral vaccines for rabies control in Europe and the United States of America. Many carnivore species are threatened or endangered. The black-footed ferret (Mustela nigripes) recovery programme serves as an example of the challenges of dealing with an endangered carnivore.

Suids

Swine were domesticated in Asia and/or South-East Asia thousands of years ago. They are popular exhibit animals, but the full exploitation of wild suids for exhibition purposes has been prevented by the fear of introducing African swine fever, which may be devastating to domestic swine. Wild suids may serve as an inapparent reservoir host to the virus.
Camelids

The camelids are another example of animals which have been domesticated for thousands of years. Formerly, these species were vital to native cultures in the Middle East, Asia and South America. Camelids were supplanted by advanced technology, but have recently returned to favour. The unique reproductive strategies and feed utilisation of these species make them prime subjects for scientific investigations. Old World camels are especially adapted to hot, arid climates, whereas South American camelids are adapted to cooler climes and may become hyperthermic in hot, humid climates.

Cervids

Tuberculosis is one of the oldest diseases of humans and of domestic animals. The discussion in the text provides an historical perspective of tuberculosis and describes the current situation of this disease in captive cervids. The burgeoning popularity of cervids as an alternative form of livestock has favoured the movement of these species internationally and within the boundaries of countries. The chronic nature of tuberculosis, together with the failure of cervids to respond to diagnostic procedures in the same manner as cattle, has caused problems in ante-mortem diagnosis, thus making regulatory control difficult.

INSTITUTIONS AND ZOOS

Quarantine and preventive medicine

The second section of the book presents chapters on the institutions which maintain captive wild animals. Preventive medicine and quarantine are emphasised. Zoos throughout the world have come to recognize that they must be involved in the conservation of wild animals. Exploitation of wild populations is no longer tenable, and there is a trend to reverse the flow of animals through captive propagation programmes which return animals to their historic habitat. Husbandry practices may allow exposure of species to disease agents which could be devastating if introduced into existing free-ranging populations. Great efforts are therefore being made to determine the pre-release health status of animals destined for reintroduction into the wild.

Captive breeding programmes

An important recent change in the management of captive zoo animals is the development of co-operative breeding programmes between zoos. In European and North American collections, species survival plans have been designed to include many disciplines (genetics, nutrition, behaviour, veterinary medicine), with the attention focused on a given species or taxon. Institution surveys and discussions at both national and international levels have led to the development of detailed management protocols for these programmes.

Game farming and ranching

The concept of game farming and ranching is not new, but these industries have expanded exponentially in recent decades. Cervid farming for meat and antler production is practised in numerous countries, with New Zealand and Australia taking
the lead. Some countries do not allow the harvesting of antlers in velvet, but the dry antlers are also of value. Current husbandry practices are described, together with some of the major infectious and parasitic diseases.

Other forms of captivity

Many species of wild animals are maintained in either temporary or permanent facilities which may be less than optimal. Public concern has encouraged the care and rehabilitation of diseased and injured wild animals. Rehabilitation centres are now found in most countries of the world. Volunteers generally staff such facilities and many have little scientific knowledge of the species received. Resources are frequently minimal. Caging and feeding may be less than optimal. The potential for transmission of diseases, particularly zoonoses, is frightening. National and international organisations now provide training and conferences to raise the level of care and well-being of animals in these facilities.

GEOGRAPHICAL AREAS

The final section of the book deals with husbandry practices and specific diseases which create challenges in selected geographical regions of the world, including South Africa, Australia, Europe, Brazil and North America.

VALIDITY OF LABORATORY TESTS

The concluding chapter should be required reading for all regulatory officers and administrators. The serological or laboratory detection of infectious diseases has been the driving force in the control of many diseases of livestock. For some diseases, but not all, the validity (sensitivity and specificity) of a given test has been determined in the appropriate livestock species. The application of these tests to wild animals may or may not be appropriate. The reasons for this are described in detail.

COMMON CHALLENGES

Although husbandry practices vary between different countries and in different facilities, common problems face all wild animal managers.

Environment, sanitation and nutrition

Housing and enclosures should be easy to clean and sanitise, but animals also need to be kept in naturalistic surroundings. Constructing facilities to satisfy both of these requirements is always a challenge. Nutrient requirements have been determined for only a few wild animal species and, even in these species, it can be difficult to fulfil the requirements utilising available feedstuffs. For the thousands of species for which there is no factual information, feeding involves extrapolation from data on related domestic animals or (if this is unavailable) reliance on tradition, keeper preferences, or trial and error.
Behavioural enrichment and training

Time is precious for those handling animals in captivity. Feeding and cleaning occupy the time of most animal keepers, yet there is a vital need to provide time for behavioural enrichment. Trained animal actions may or may not be a high priority function of keepers, but there is a basic need to train animals to accept painless veterinary procedures (collection of blood and urine, measurement of body temperature).

Maintenance of facilities

Funds are limited, and are channelled as a priority to provide for the basic care of captive wild animals (labour, food, shelter), leaving little money to be spent on capital improvements. There is a chronic shortage of funds for the repair, maintenance and replacement of facilities. One often hears the complaint that 'these facilities need to be improved, but there is no money.'

THE FUTURE

Wild animals will continue to be maintained and exhibited in captivity. The challenge facing managers today is to provide the animals with an environment which is as free from stress as possible. Enclosure design must meet the needs of the animals, rather than serving as a monument to architects. Greater emphasis must be placed on formulating diets on the basis of known foraging in the wild and scientifically-determined nutrient requirements.

Veterinarians, diagnosticians and regulatory officers need to work together to validate diagnostic tests and to ensure humane transport and quarantine conditions for wild animals. Preventive health care will be enhanced by acquiring more information on the susceptibility and/or resistance of wild animals to specific disease agents.

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Résumé : L’auteur résume les autres articles que contient ce Volume 15 (1), mars 1996, de la Revue scientifique et technique de l’Office international des épizooties. Ces textes traitent des soins prodigués aux reptiles, amphibiens, oiseaux, ratites, carnivores, suidés, camélidés et cervidés, ainsi que de la gestion de ces espèces et des conséquences zoo-sanitaires de leur maintien en captivité. Les locaux, l’alimentation et la gestion des élevages sont souvent peu satisfaisants et l’on ne connaît pas toujours les besoins particuliers de certaines espèces. La prévention des maladies exige une surveillance constante. Il reste beaucoup de progrès à réaliser dans le domaine de la recherche sur la pathologie de certaines espèces et sur la validité, pour les espèces sauvages, des épreuves de diagnostic mises au point pour des animaux domestiques.

Resumen: El autor sintetiza los demás artículos presentados en el Vol. 15 (1), marzo de 1996, de la Revista científica y técnica de la Oficina Internacional de Epizootias. Los artículos abarcan los siguientes temas: cuidado y manejo de los reptiles, anfibios, aves, aves corredoras, carnívoros, suidos, camélidos y cérvidos, así como las consecuencias sanitarias que entraña mantener esas especies en cautiverio. El alojamiento, la alimentación y el manejo distan a menudo de ser perfectos, y pueden desconocerse los requisitos especiales para determinadas especies. Es necesaria una vigilancia constante para prevenir las enfermedades. Aún queda mucho por investigar en materia de enfermedades de ciertos animales, y en relación con la validez en las especies salvajes de las pruebas de diagnóstico elaboradas para animales domésticos.

PALABRAS CLAVE: Animales salvajes – Animales de zoológico – Cría – Enfermedades – Manejo.