



A CASE STUDY

Wild animals in captivity with special reference to carnivore health

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Key words : Wild animals in captivity, Carnivore health

How to cite this paper : Shukla, M., Pandey, A. and Pandey, Yogita (2014). Wild animals in captivity with special reference to carnivore health, *Vet. Sci. Res. J.*, **5**(1&2) : 50-53.

Paper History : Received : 16.12.2013; Accepted : 27.09.2014

INTRODUCTION

The role of today's zoo is as much about conservation and education as it is about entertainment. So as to not only to maintain the part of populations of endangered species, but also to create awareness and education, it is very vital to maintain the top carnivores in zoo as healthy as possible. For the healthy maintenance of these valuable endangered species of animals, proper scientific management of these animals in terms of health, food and sanitation and hygiene are very important.

The need for scientific management has grown considerably and also new field of science like genetics, demography conservation biology biotechnology and others are now being explored. Ensuring the good health for longevity of the species as well as for ensuring their breeding potential is a unique and challenging task for zoo managers. Hediger (1964) was the first person to document biological and ethological principles important for the welfare of captive animals in zoos. By understanding an animal's behaviour, facilities that cater for the animal's needs can be designed.

Zoo animal management primarily aims at providing

quality care for the in-house animals and presents the animals in a safe and professional manner. The objective of zoo management is to improve living condition of the animals with regards to housing, feeding, stimulating their reproduction and keeping them physiologically and ethologically healthy. Maintenance of good animal health is one of the most challenging tasks for zoo managers and veterinarians. The basic concerns to manage the wild animals in captivity are :

- Providing space and shelter facilities.
- Providing sufficient balanced food and water.
- Regular monitoring of health and well-being.
- Maintaining hygienic standards.
- Managing populations.
- Supervision and training of staff and volunteers.
- Maintaining relevant records.

Objective :

To highlight the factors responsible for managing overall health of wild animals in captivity.

RESEARCH METHODOLOGY

Source of information :

To study the health management methods followed in various zoos and captivity in India information are collected by the following methods.

Primary sources :

- Direct observation.
- Direct interaction with zoo staffs.
- Through questionnaire.

Secondary sources :

- Literature reviewed.
- Internet.

Study sites :

To study the managing the health of wild animals in captivity, the information are collected from the following zoos

- Mysore zoo
- Nandhankanan Zoological Park
- Padmaja Naidu Himalayan Zoological Park, Darjeeling

These zoos are visited during 2007 batch and information are collected by direct observation, interaction with zoo staffs. One questionnaire was prepared and it was utilized to collect the information. The format of the questionnaire is given below.

Questionnaire :

- Name of the park/captivity
- Location
- Type of carnivores present
- Stock selection
- Enclosure / housing
- Quarantine facility
- Management practice
- Feeding and watering
- Disinfection used
- Veterinary interventions
 - Veterinary doctor
 - Veterinary facility
 - Common diseases
 - Deworming
 - Vaccination
- Any other comments

RESULTS AND DISCUSSION

The information collected are summarized and given below in the form of filled questionnaire

Mysore zoo :

- *Name of the park / captivity* : Mysore Zoo
- *Location* : Mysore
- *Type of carnivores present* : lions and tigers and leopard
- *Stock selection* :

Enclosure / Housing :

Semi free ranging closed cages attached with enclosures.

A major component of tiger management is the facility designed and built to house them. From the outset, the team of people designing the structure includes the architect, curators (animal, horticulture and education), veterinary staff, keepers and director. Problems in design and construction lead to unfavorable facilities that may promote health problems and behavioral problems, such as inactivity and/or pacing that can be prevented by forethought. Many physical aspects of the facility must be considered.

Irrespective of the enclosure use, the design must avoid a situation in which an animal cannot be fully seen for monitoring, or reached or shifted for potential treatment or immobilization.

Each enclosure must provide a cleanable, disinfectable water source accessible to both the tigers and keepers that can be shut off and drained. This allows monitoring water intake and water deprivation in certain clinical situations, such as pre- or post-immobilization.

The size, nature and abilities of the tiger require secure containment. Modern exhibition of large cats is away from barred enclosures and toward large, naturalistic fenced and moated enclosures. Such exhibition requires careful planning. A tiger moat should be a minimum of 7 m wide at the top and a minimum of 5 m high on the visitors' side. This moat wall should be sheer and unclimbable. The moat wall on the tiger's side should be at a slight angle rather than vertical. There is no need for the moat to be very wide at the bottom, but it should have a large drain capable of carrying away rain, seepage, and wash water.

Fences should be at least 5 m high and vertical except for the top 1m which should be turned into the exhibit at about a 45 angle. This fence should be constructed of heavy-gauge steel with equally strong support posts and a concrete footing to prevent digging under the fence. Another way to prevent escape under the fence is to bury the fence at least 1m and angled toward the inside of the exhibit. Care should be taken to be sure that there are no large trees close to the perimeter fence that if climbed by tigers would allow any access to the top of the fence. Adult tigers are unlikely to climb any vertical trees, but young tigers may climb. Fence chargers and "hot wires" have no place in the containment of large cats. The only use of "hot wires" is to keep animals such as tigers away from some areas of the enclosure. "Any perimeter fence around an exhibit for animals such as tigers should be checked every day before animals enter the exhibit

to be sure that the fence has not been damaged”.

In Germany minimum standards for a tiger enclosure are 25m² for an adult pair and cubs for inside; 40m² for outside. For each additional tiger an extra 4m² inside and 10m² outside are required. While designing or constructing the buildings for wild animals one should consider system of animals production, design of building and equipments besides various other factors. As per Walker and Molour (2000), minimum space requirement for tiger and lions are 2.75×1.80×3.00 m³. CZA prescribes a minimum size of 1000 sqm for the first animal and an additional 250 sqm per animal.

Animal	Male	Female
Tiger	10 – 12 kgs	9 – 10 kgs
Lion	12 – 14 kgs	10 – 12 kgs
Leopard	3 – 4 kgs	2 – 3 kgs

- Quarantine facility : present
- Management practice :
- Feeding and watering : excellent feeds

These results are in agreement with Prabhu *et al.* (2001) reported that an adult tiger requires 10 kg meat comprising beef / chicken as an average. Fasting one day in a week is essential. An adult lion require 12 kg buffalo meat/day as an average, it may range from 10 -15 kg. Kanpur zoo feeds lions and tigers with buffalo meat based on its requirement. Feed additives / supplements 2 times a week orally is practiced. Like mineral mixture or vitamins or growth promoters on a rotational basis. water troughs filled with water 2 times a day. Nutrition is the vital for any living animal for its normal physical physiological work and to maintain its health. Various nutrients like carbohydrates, protein, minerals and vitamins have their own function in the body to maintain normal functioning of body. Nutrients are to be supplied in adequate quantity with balanced quality. All these nutrients are supplied to animals through feeds. Feed requirement varies based on body weight, physiological conditions and animal's involvement in various types work etc. Insufficient feeds or nutrients or / and unbalanced feeds may leads to insufficient nutrition, starvation, emaciation, immune deficiency, makes the animals susceptible to diseases besides causing nutritional deficiency diseases. Some times feeding certain nutrients more than its requirement may also leads to toxicity or disease conditions. Similarly findings were obtained by Brambell (1972), Tennant and Chipperfield (1972), Ludwig (1981), Crowcroft (1978), Eaton (1981).

According to Kleiber (1964) adult tigers are fed to maintain body condition, with general maintenance energy requirements = 140 kcal (body mass in kg)^{0.75}. Thus a female averaging 123 kg requires 5170 kcal/day, whereas, a 160 kg male requires 6300 kcal. Metabolizable energy (ME) requirements can be met by daily feeding 3.1 and 4.1 kg respectively, of commercial diets containing about 2.00 kcal/

kg (as fed basis) daily, with a digestibility co-efficient of 0.84. Feeding bones (femur bones, oxtails, rawhide) has an additional function in promoting periodontal health and provides an opportunity to exhibit more natural feeding behaviors and presumably is enriching to the animals. Similar findings were obtained by Pond *et al.* (1995), Robbins (1983), Robbins (1993), Sawarkar (1986).

Guaranteed Analysis

Crude protein :	19.0 per cent (min.)
Crude fat :	12.0 per cent (min.)
Crude fiber :	1.5 per cent (max.)
Ash :	4.5 per cent (max.)
Calcium :	0.6 per cent (min.)
Phosphorus :	0.5 per cent (min.)
Moisture :	62.0 per cent (max.)
Vitamin A :	7,500 IU/lb. (min.)
Vitamin D3 :	850 IU/lb. (min.)

The commercial feline diet used in American Zoos is :

- Disinfection used : Cohorsiline TH
- Veterinary internentions
- Veterinary doctor : Present
- Vet. Facility : 1. World class Veterinary hospital 2. Laboratory 3. Pharmacy 4. X-Ray lab 5. Operation theater 6. Nursing yard.
- Deworming : Once in 6 months and if it is found positive repeat after 19 days. Cyclical change of deworming drug is important to avoid getting the parasites resistance to particular drugs.
- Vaccination : for trypanosomiasis Triquin Inj. S/C once in every 3 months after reconstitution 2-3 ml/ animal. For rabies, vaccinated once in a year .
- Any other comments : Wooden planks of 1 and half feet height is of very well required inside the den of each animal to take rest and feed on the meet by sitting on the table also gives the animal warmth during winter.

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