

SEASONAL DISTRIBUTION OF DEATHS OF TIGERS (*PANTHERA TIGRIS*) IN INDIAN ZOOS

Anupam Srivastav¹ and Bipul Chakrabarty²

¹Anupam Srivastav, Director, Parimit, 102 Pocket D-15, Sector III, Rohini, New Delhi 110085, India.

²Bipul Chakrabarty, Scientist, Central Zoo Authority, Bikaner House Annexe VI, Shahjahan Road, New Delhi 110003, India.

Abstract

The population of Tigers (*Panthera tigris*) in Indian zoos number 347 in 2000. Average mortality rate per annum during the period was 8.26%. The present study suggests that mortality is maximum during winters. Diseases of the digestive and respiratory systems and behavioural disorders are the major causes, being responsible for 23 deaths each. Other causes of concern are generalized conditions and diseases of the blood, lymphatic and cardiovascular system. Since diagnosis of sick animals is a major problem preventive measures are discussed.

Keywords

Zoos, Tiger, *Panthera tigris*, digestive system, respiratory system, behavioural disorders, preventive measures, quarantine, mortality

Introduction

The Tiger is the most written about animal in this part of the world, yet despite all of the articles about the species we are still left with missing pieces about its life. Presently five subspecies of tigers have been recognised as existing. These are *Panthera tigris altaica* (distribution in South-east Russia, Northeast China and North Korea), *P. t. amoyensis* (distribution in Central and East China), *P. t. corbetti* (distribution in South China, Myanmar, Thailand, Vietnam, Laos, Cambodia and Peninsular Malaysia), *P. t. sumatrae* (distribution in Sumatra - Indonesia) and *P. t. tigris*, the Bengal Tiger (distribution in India, Nepal, Bangladesh, Bhutan and North-west Myanmar) (Tilson *et al.*, 1990).

The Bengal Tiger is a solitary animal that inhabits practically every forest type of India - thorny, dry and moist deciduous, semi-evergreen, mangrove, swampy, tall grasses, grassland scrub mosaic up to an altitude of 3600m. It is found practically throughout India except for the drier tracts of Gujarat, Rajasthan, Punjab and higher reaches of the Himalaya (Anon., 1994).

In India the population size of the subspecies in wild was reduced drastically during the earlier part of the last century. The situation was brought about as a result of extensive habitat destruction and poaching. As a consequence the Project Tiger was launched in India in 1973 to conserve the subspecies and its habitat. The program has been successful to the extent that the rate of habitat destruction is greatly reduced. The population of free ranging tigers in India in 1997 was 3508 (Jain, 2001).

Zoos have the unique challenge of maintaining living collections and tigers have been the high on the list of most-popular animals. The display and care of tigers in zoological parks has a long history. In 46 Indian zoos displaying tigers, the population was 331 in April 1995, which marginally increased to 347 in March 2000. The average mortality rate during this period was 8.26% (Srivastav, 2000). It is however surprising that with this long history and the numerous tigers in captivity, little medical data has been published. Therefore, in the present paper an attempt has been made to analyse the major reasons responsible for the deaths of tigers in captivity in Indian zoos, so that zoo managers can benefit from this review.

Material and Methods

Data for the present study was abstracted from a previous study on the 'Mortality causes of endangered species in Indian zoos' (Srivastav, 2000). Though at present 46 zoos are displaying tigers in India, data for only 30 zoos was available, which have been considered for the analysis. A list of these 30 zoos is given in Table 2. The various causes of death were grouped together on the basis of the system they effected (Fraser *et al.*, 1991). This was adopted due to the reason that common people including the zoo managers do not know about the technicality of various diseases affecting the animals, and by simplifying the process, immediate management decision could be taken for prophylactic measures. The details of the diseases under the broad system they affect are listed in Table 1. An attempt has also been made to group the incidence of diseases in different seasons, namely, summer (March-June), monsoon (July-

Table 1. Seasonal mortality of tigers in Indian zoos.

System effected	Disease / cause of death	Summer	Monsoon	Winter	Total
Blood, lymphatic and	Anemia, cardiac failure, trypanosomiasis cardio-vascular system	6	3	4	13
Digestive system	Enteritis, gastritis, gastric ulcers, gastro- enteritis, hepatitis, peritonitis	6	10	7	23
Nervous system	CNS disorder, paraplegia	1	0	0	1
Reproductive system	Pyometra, endometritis	2	0	3	5
Respiratory system	Asphyxia, cardio-respiratory failure, pleurisy pneumonia, tuberculosis	5	6	12	23
Urinary system	Cystitis, nephritis, renal insufficiency	3	0	2	5
Generalized conditions	Hemorrhage, infection, septicemia, shock toxaemia	4	6	9	19
Neoplasmas	Malignant neoplasmas	3	1	1	5
Behavioural disorders	Cannibalism, maternal rejection	6	11	6	23
Physical influences	Injury, hypothermia, hyperthermia	1	2	3	6
Miscellaneous	-	5	7	9	21
Total		42	46	56	144

October) and winter (November-February).

Results and Discussion

A perusal of Table 1 suggests that maximum mortality of tigers is observed during winter. Respiratory diseases being responsible for 12 of the 56 deaths that occurred during winter. During monsoons behavioural disorders (11) and diseases of the digestive system (10) are the major causes of mortality. Overall diseases of the digestive system, respiratory system and behavioural disorders (23 each) account for 47.9 of the total 144 deaths.

The high incidence of digestive tract illnesses during monsoons in zoos is probably due to the high temperature and humidity. These weather conditions cause proliferative increase in bacterial/pathogen populations. The source of infection of animals may be through contaminated food or water. Other major causes of concern are generalized conditions (19). Diseases of blood lymphatic cardiovascular system are other areas of concern during the monsoons and summers, as was evinced by the outbreak of trypanosomiasis in Nandankanan Zoo in May 2000 which claimed 12 tigers.

Conclusion

It has been noticed that sick zoo animals are difficult to manage and therapeutic measures adopted may always not yield the desired results (Acharjyo, 1999). It is difficult to diagnose diseases in zoo animals, as often by the time the symptoms

manifest the disease has progressed to a near fatal condition. In addition accurate diagnoses of the pathogen is often not carried out due to the lack of adequate pathological facilities in the zoos. The response to therapy and consequently recovery rate is therefore poor.

It is suggested that zoo managers follow the basic health care practices like:

Preventive measures

The adage 'prevention is better than cure' is best suited for health care in zoos as the curative aspect often fails. Preventive measures that the zoo authorities can easily implement are vaccination, sanitation and vector control. Improved sanitation and vector control will by themselves be able to reduce the probability of infection by pathogens.

Routine medical check-up

Regular medical check-up of the tigers in zoos by expert veterinarians will allow them to identify and treat sick tigers in time to prevent fatalities. Also advisable would be routine pathological examinations of faeces and if possible of urine and blood to check for parasite loads. Routine medical examination of personnel coming in contact with tigers is also important, as sick persons are liable to transmit their infections to the animals.

Quarantine

Adequate quarantine procedures should be followed for all new acquisitions and animals with infectious diseases. This will

Table 2. Name of zoos which provided data on mortality.

Name of the Zoo	Location
Arignar Anna Zoological Park	Vandalur, Chennai
Assam State Zoo cum Botanical Garden	Guwahati
Aurangabad Municipal Zoo	Aurangabad
Bellary Childrens Park-cum-Zoo	Bellary
Bhagwan Birsa Biological Park	Ranchi
Gandhi Zoological Park	Gwalior
Indira Gandhi Zoological Park	Vishakapatnam
Jaipur Zoo	Jaipur
Jawaharlal Nehru Biological Park	Bokaro
Kamla Nehru Prani Sangrahalaya	Indore
Kanpur Zoological Park	Kanpur
Kota Zoo	Kota
Maharajbag Zoo	Nagpur
Maitri Baagh Zoo	Bhilai
Nandankanan Biological Park	Bhubaneswar
National Park, Bannerghatta Zoological Garden	Bangalore
National Zoological Park	Delhi
Nehru Zoological Park	Hyderabad
Peshwe Park Zoological Gardens	Pune
Prince of Wales Zoological Gardens	Lucknow
Sakkarbaug Zoo	Junagadh
Sanjay Gandhi Biological Park	Patna
Sanjay Gandhi Biological Park	Mumbai
Sayaji Baug Zoo	Vadodra
Sri Chamarajendra Zoological Gardens	Mysore
State Museum and Zoo	Thiruvananthapuram
Tata Steel Zoological Park	Jamshedpur
Udaipur Zoo	Udaipur
Zoological Garden	Kolkata
Zoological Park	Bikaner

reduce the probability of their spreading infections to the zoo population. Intensive pathological examinations need to be carried out on blood, urine and faeces of animals during the quarantine period as they can be restrained relatively easily.

Training

Personnel involved in the care of animals should be trained to observe behavioural patterns of their charges. Abrupt changes in activity patterns are usually the first indicators of illness.

Research

There have been significant advances in diagnostic techniques. These are centered mainly on immuno-diagnostic methods and they have the advantage of being accurate. Incorporating these practices in zoos will bring about a significant improvement in consequent therapy and thus overall wellbeing of zoo animals.

References

- Acharjyo, L.N. (1999).** Health care of zoo animals - Prevention and Control of diseases. *Proceedings of Workshop on Health and Management of Zoo Animals for Zoo Veterinarians*, organized by the College of Veterinary Science, Assam Agricultural University, Guwahati 28-30 Oct.
- Anon (1994).** *The Red Data Book of Indian Animals: Part I Vertebrata*. Zoological Survey of India Calcutta.
- Fraser M.C., J.A. Bergeron, A. Mays and S.E. Aiello (1991).** The Merck Veterinary Manual.
- Jain, P. (2000).** *Project Tiger Status Report*. Ministry of Environment and Forests, Government of India.
- Srivastav, A. (2000).** *Analyses of causes of mortality of selected endangered animals in Indian zoos. Technical Report*. Central Zoo Authority (Unpublished).
- Tilson R., G. Brady, K. Traylor-Holzer and D. Armstrong (1990).** *Management and conservation of captive tigers Panthera tigris*. Minnesota Zoo, Minnesota.