

TITLE OF THE PROJECT

**“ PILOT STUDY ON COMMON FOOT AILMENTS IN
CAPTIVE ASIAN ELEPHANTS (*Elephas maximus*) OF
TAMILNADU ”**

SUBMITTED TO

**CENTRAL ZOO AUTHORITY OF INDIA,
BIKANER HOUSE,
ANNEXE VI,
SHAHJAHAN ROAD,
New Delhi – 110 011**

By

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**PILOT STUDY ON COMMON FOOT AILMENTS IN
CAPTIVE ASIAN ELEPHANTS (*Elephas maximus*) OF
TAMILNADU**

Of all the wild animals, the Elephant is considered to be an integral part of the culture and mythology in India, ever since the vedic age. Tamilnadu has the distinction of the presence of many age old temples with rich cultural heritage and they are unique in maintaining elephants for celebrations and religious ceremonies.

BACKGROUND

The Department of Wildlife Science at Madras Veterinary College, the first of kind in our country has functioned as a " Nodal Centre of Wildlife Health and Disease Diagnosis " catering to various Zoos / Zoological gardens / Zoological parks in Southern India till 31-3-2007 as a project from Central Zoo Authority of India. Following research works have been already carried out in captive Asian elephants in a systematic manner in this department.

- 1) Hematological and biochemical studies in captive Asian elephants (1998)
- 2) Electrocardiography, Pulse-oximetry and capture related enzyme analysis in captive Asian elephants (1998)
- 3) Epidemiology of Helminthic parasites in wild and domestic herbivores at the Mudumalai wildlife sanctuary, Tamilnadu (1999)
- 4) Study on cortisol and progesterone level and health related parameters in female Asian elephants (2001)
- 5) Study on morphometric indices and clinical management of wounds and abscesses in captive Asiatic elephants (2003)

- 6) Health based ecological study of elephants with emphasis on salt licks at Mudumalai wildlife sanctuary (2006)

Further the Department of Wildlife Science is also being associated in various wildlife health and disease related research activities, since a decade and samples from the field Veterinarians, Zoo and wildlife Sanctuaries are being analysed for the evidence of disease causing pathogens.

REVIEW OF LITERATURE & STATEMENT OF NEED

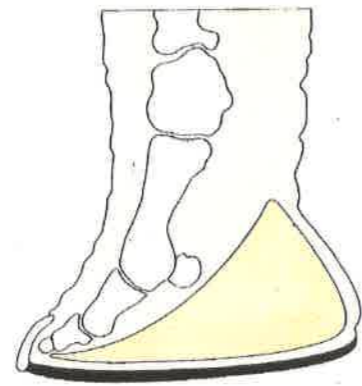
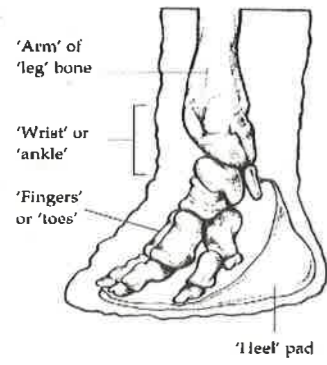
FOOT of the elephant is a masterpiece of evolutionary development specially designed to support the weight of the largest terrestrial mammal. Fowler (1986) reported that foot problems are common in captive elephants. He opined that abscessation of the foot in elephant is a common sequelae to injury or poor foot care and he also reported a case of Podo-dermatitis in an elephant foot.

According to Csuti *et al.*, (2001) foot problems constitute the single most important ailment of captive elephants. Schmidt (1984) reported that fungus like *Aspergillus neiger*, *Trichophyton terrestre* and yeast were isolated from foot lesions in elephants. Arora (2003) has reported a case of hyperkeratosis and severe cuticular splitting growths around the nails in a zoo elephant.

Pathan and Senthilkumar (2005) reported a case of foot rot in a zoo elephant suffering from severe pain and swelling in the right fore limb. Mikota *et al.*, (1994) and Csuti *et al.*, (2001) reported that medical problems of foot were seen in 50 % of the captive elephants studied and there had been no formal studies of the microorganisms encountered in foot infections of elephants.

ELEPHANT FOOT STRUCTURE

Detail of the elephant foot



Foot rot



Podo-dermatitis



Cuticular Split & crack nail



Nail abscess



Though the foot problems may not directly challenge the life of the elephants, there will be serious economic loss in terms of productivity and utility of the animal and if the ailment is not handled properly in time, it may eventually lead to a painful death in due course. Hence a preliminary study is essential to know about the common foot problems and their management in captive elephants.

Keeping this in view, this research project entitled “ **Pilot study on common foot ailments in captive Asian elephants (*Elephas maximus*) of Tamilnadu** ” has been formulated with the following objectives.

OBJECTIVES

- 1) To identify the common foot problems encountered in captive Asian elephants.
- 2) To analyse the predisposing factors leading to foot problems in captive elephants.
- 3) To identify the bacterial organisms in the foot lesions and to suggest appropriate treatment measures.
- 4) To screen the fungal infections of the foot and to suggest appropriate treatment measures.
- 5) To suggest proper foot care management practices for captive elephants.

STUDY AREA

- 1) Elephant camp sites at Mudumalai Wildlife Sanctuary and Indira Gandhi Wildlife Sanctuary, Anaimalai, Tamilnadu.
- 2) Arignar Anna Zoological Park, Vandalur, Chennai.
- 3) Temples maintaining Elephants in Tamilnadu state.

RESEARCH METHODOLOGY


- General husbandry conditions of the elephants including the type of shed, flooring, tethering site, feeding pattern, Cleaning, hygiene and sanitation, foot care and management practices followed if any., will be observed and recorded.
- Clinical examination of all the four feet of the elephants will be carried out.
- Materials for microbiological examination will be taken from the foot lesions encountered during the study period and subjected to microbiological examination as per the standard procedures.
- The samples collected from the foot lesions of the elephants will be subjected to cultural examination, isolation and antibiotic sensitivity test and suitable treatment measures will be suggested in addition to designing of protective covering for foot lesions.

DURATION OF PROJECT :- TWO YEARS (24 months)

TENATATIVE SCHEDULE OF ACTIVITIES

S.No	Activity	Start (months)	End (months)
1.	Purchase of chemicals and reagents	0	3
2.	Purchase of Equipments	0	3
3.	Recruitment of JRF	0	3
4.	Getting Permission from Forest Department and Temple authorities	0	4
5.	Field work and Laboratory analysis	4	24

Total duration of Project :- 24 months

PRINCIPAL INVESTIGATOR**Dr. K.S. SUBRAMANIAN, M.V.Sc (Wildlife Sc), M.D (AM),**Assistant Professor,
Department of Wildlife Science,
Madras Veterinary College,
Vepery, Chennai - 600 007.


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CO - PRINCIPAL INVESTIGATORS

1) **Dr. V. PURUSHOTHAMAN, M.V.Sc., Ph.D.,**
Director of Research,
Tamilnadu Veterinary and Animal Sciences University,
Madhavaram, Chennai – 600 051.



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Tamilnadu Veterinary and Animal
Sciences University
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2) **Dr. M.G. JAYATHANGARAJ, M.V.Sc., Ph.D., PGDWLM.,**
Professor and Head,
Department of Wildlife Science,
Madras Veterinary College, Chennai – 7.



Professor & Head
Department of Wildlife Science
Madras Veterinary College
Chennai-600 007

BUDGET ESTIMATE

S.No	Details	Total amount (in Rupees)
1.	Recurring	6,06,200 - 00
2.	Non – recurring	96,000 - 00
3.	Institutional charges	90,930 - 00
4.	Total	7,93,130 - 00

BUDGET REQUIREMENT (IN RUPEES)

S.No	Details	I Year	II Year	Total
A. RECURRING CONTINGENCIES:-				
1.	Salary for ONE Junior Research Fellow @ Rs 8000/- & eligible HRA (10% of the pay) per month	1,05,600	1,05,600	2,11,200
2.	Laboratory Chemicals, Reagents and other consumables	40,000	30,000	70,000
3.	Traveling allowances for TWO Technical persons	80,000	80,000	1,60,000

4.	Stationaries, Preparation of Booklets and Management guides	15,000	35,000	50,000
5.	Training program to the Mahouts / Elephant keepers (For 5 days) – including Training materials, Boarding & Lodging, field visits and other expenses @ Rs 2500 per person for 40 persons	----	1,00,000	1,00,000
6.	Medicines, and other miscellaneous expenditures	7000	8000	15,000
A.	Total	2,47,600	3,58,600	6,06,200
B. NON-RECURRING :-				
1.	Liquid Nitrogen container with probes	50,000		50,000
2.	Laptop computer with accessories	40,000		40,000
3.	Storage Rack (2 No's)	6000	-----	6000
B.	Total	96, 000	-----	96, 000
Institutional charges @ 15% on recurring expenses		37,140	53,790	90,930
Grand total		3,80,740	4,12,390	7,93,130

JUSTIFICATION

- JUNIOR RESEARCH FELLOW

The JRF appointed in this proposed project will be engaged in processing the field samples and assist in the microbiological examinations and other technical assignments in the project.

- LIQUID NITROGEN CONTAINER WITH PROBES

This equipment will be very useful for desensitization and removal of necrotic tissues in the foot lesions without pain and bleeding, there by facilitating the healing process with least stress to the animal.

- LAPTOP COMPUTER SYSTEM

This will be very useful for the field level documentation and also to create awareness among the mahouts / elephant keepers and the temple authorities about the importance of foot care and management.

- STORAGE RACK

The storage rack will be very useful in keeping the laboratory reagents, instruments, technical files, records, bills and other stationeries.

ANTICIPATED BENEFITS OF THIS PROJECT

- The study will be of immense use in controlling the foot problems in captive elephant management.
- This will create an awareness among the elephant keepers and Mahouts about the importance of foot care and management.
- This study will provide a preliminary database about the microbial fauna in the foot lesions of elephants and the important factors that predispose the foot problems in captive elephants, which will facilitate the authorities to formulate proper prophylactic measures.
- The observations and outcome of this study will be very useful to the field veterinarians, Zoo and Wildlife veterinarians in treating and controlling the foot problems in elephants, thereby increasing the work ability, utility and longevity of the animal.

EXPERTISE OF THE INVESTIGATORS

- 1) **Dr.V. Purushothaman** – One of the Co- Principal Investigator of this project has been in active research since 30 years. He is the first to report the occurrence of *Peste des Petits ruminants* among sheep in the country and involved in the development of PPR vaccine. He has received several awards, published 52 research papers and done post-doctoral research in Indian Institute of Science, Bangalore and Nippon Institute of Biological Sciences, Japan.
- 2) **Dr.M.G. Jayathangaraj** - one of the Co - Principal Investigator of this project has been in active research since 15 years and has completed three research projects. Organized training programs in the field of wildlife health for Zoo Veterinarians, International students, etc. He has published 77 national and international articles and has completed a PG diploma course on Wildlife Management at Wildlife Institute of India, Dehradun.
- 3) **Dr.K.S. Subramanian** – the Principal investigator of this project is specialized in Wildlife Science from Tamilnadu Veterinary and Animal Sciences University, Chennai and has been associated in the field since 12 years. He has completed one University research sub-project on Peafowl, our National bird and undergone training on Elephant management at Kerala Agricultural university. He has published 13 research articles in reputed journals and working as Assistant Professor in the Department of Wildlife Science.

FACILITIES AVAILABLE IN THIS DEPARTMENT**(PERTAINING TO THIS PROJECT)**

- 1) Laminar flow system
- 2) Bio-Safety Cabinet Class II
- 3) Deep freezer
- 4) Inverted microscope
- 5) Nikon Microscope with Camera
- 6) Digital Camera
- 7) Video Handycam

REFERENCES

Arora, B.M. 2003. Indian Wildlife Diseases and Disorders. First Edition. Association of Indian Zoo & Wildlife Veterinarians, UP, India. Pg;438.

Csuti, B., Sargent, E. L and Ursula S. Bechert. (2001). First edition. The Elephant's Foot – Prevention and Care of foot conditions in captive Asian and African Elephants. Iowa State University Press, Ames, Iowa, USA.

Fowler, M.E. 1986. Zoo and Wild Animal Medicine. Second Edition. W.B. Saunders Co, Philadelphia, USA.

Mikota, S.K., E.L. Sargent and Ranglack, G.S. 1994. First edition. Medical Management of Elephants. Indira Publishing House, West Bloomfield, Michigan. Pg; 137 – 150.

Pathan Nazrulla Khan and K.Senthilkumar (2005)
Foot rot in elephant. AAZP News letter, December'05; Vol: 19(3).

Schmidt, M.J (1984) in M.E. Fowler (Eds).
Zoo and Wild Animal Medicine, W.B. Saunders co., Philadelphia, USA.



CURRICULUM VITAE

NAME	DR.K.S.SUBRAMANIAN, M.V.Sc., M.D (AM)
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CONTACT MODE	Phone : 044 - 25630700 Mobile : 9445230916 <i>Email : drkswildlifevet@yahoo.co.in</i>

QUALIFICATIONS

Degrees / Diploma	Institution	Year & Grade
B.V.Sc	Tamilnadu Veterinary and Animal Sciences University	1991 & 3.42 / 4.00
M.V.Sc (Wildlife Science)	Tamilnadu Veterinary and Animal Sciences University	1999 & 9.1 / 10.00
M.D (Alternative Medicine)	Indian Board of Alternative Medicine.	Successfully completed
Cert. Course in Ornithology	Rishy Valley Education Centre, Andra Pradesh.	Successfully completed
Dip. In MS Office	Pentagon Academy.	Successfully completed

DETAILS OF POSITIONS HELD

S. No	Name of the Post	Place where employed	Period
1.	Graduate Assistant	Tamilnadu Veterinary and Animal Sciences University	31-01-1994 to 02- 08 – 2002
2.	Veterinary Assistant Surgeon	Govt. of Pondicherry	14-08-2002 to 05 – 01 – 2006
3.	Assistant Professor	Tamilnadu Veterinary and Animal Sciences University	06 – 01 – 2006 to Till date

MEMBERSHIPS IN PROFESSIONAL SOCIETIES:

S.No	DETAILS
1.	Member of Veterinary Council of India
2.	Life member of Indian Society of Veterinary Epidemiology and Preventive Medicine

BOOKS & MANUALS PREPARED / ASSOCIATED :

1. **AZHAGIYA KANUYIR** (in Tamil)
(Author : K.S.SUBRAMANIAN)
2. **Manual on Elephants for Field Veterinarians - 2006**
(Authors : M.G.Jayathangaraj, K.S.Subramanian, A.Senthilkumar & S.Ramesh)

TECHNICAL BULLETINS PREPARED / ASSOCIATED :

1. **Management of Orphaned Elephant calf – 2006**
(Authors : M.G.Jayathangaraj, K.S.Subramanian ,S.Gomathynayagam,
K. Senthilkumar and N.S.Manoharan)
2. **Veterinary care and management of Elephants - 2007**
(Authors : M.G.Jayathangaraj, K.S.Subramanian and S.Gomathynayagam)
3. **Basic Information on Reptiles - 2007**
(Authors : M.G.Jayathangaraj, K.S.Subramanian and S.Gomathynayagam)

SUB-PROJECTS / REVIEWS CARRIED OUT : Two

1. STUDY ON NESTING BEHAVIOUR AND EGG PARAMETERS OF FREE RANGING PEAHEN (*Pavo Cristatus*) – 2000
2. KOONTHAKULAM BIRDS SANCTUARY – AN OVERVIEW

CD'S PREPARED / ASSOCIATED : - Two

1. About Elephants for field Vets
2. Taxonomy of wild mammals with special features

RESEARCH ARTICLES PUBLISHED :- 13 No's

S.No	Details of the Article	Publication
1	Social organization and feeding behaviour of free ranging peafowl in south Tamilnadu.	International WPA News 64; Feb ' 2001, 7
2	Nest morphometry of pheasant tailed jacana	Zoo's print Jr; 15 (7) ; 300
3	Colibacillosis in a peacock	Zoo's print Jr; 15 (10) ; 350
4	Roosting and nesting habits of free ranging Indian peafowl in south Tamilnadu	Zoo's print Jr; 16 (7) ; 537
5	Morphometric studies on parasitic fauna of free ranging Indian peafowl.	Zoo's print Jr; 18 (3) ; 1055
6	Incidence of endoparasitic infection in a captive king cobra	Ind.Vet. Jr; 78 ; 551 -552
7	Intestinal protozoan infection and ecto-parasitism of free ranging Indian peafowl	Ind.Vet. Jr; 79 ; 276 -277
8	Pilot study on parasitic fauna of free ranging Indian peafowl	Zoo's print Jr; 18 (5) ; 1096
9	Some observations on the clinical signs of blue tongue in sheep	Ind. Jr. Small ruminants; 6 (2); 2000
10	Epidemiological observation on blue tongue in Tirunelveli	Ind.Vet. Jr; 78 ; 945 -946
11	Syngamiasis in Peafowl	Zoo's print Jr; 18 (9) ; 1204
12	Probable Peste-des Petits Ruminants in free ranging spotted deer	Zoo's print Jr; 18 (9) ; 1205
13	Computer automated analysis of morphometric characteristics of epididymal spermatozoa of spotted deer (<i>Axis axis</i>)	The Indian Jr. Animal Reproduction ; 27(1): 77-79.

ACADEMIC EXPERIENCE :-

- Undertaking the course LPM 312 (1+ 1) – Wild and Zoo animal health care and management / Fish production for the third year B.V.Sc students.
- Undertaking the internship training program (on wildlife science at Zoo and National park) for the UG internees of Madras Veterinary College.

