STORY OF
K P sree kumars’

ELEPHANT EQUATION

from College of Veterinary and Animal Sciences in Mannuthy, a suburb of Kerala

IgNOBLE IS A PARODY OF NOBLE PRIZE

- IT IS GIVEN TO DISCOVERIES WHICH MAKE PEOPLE TO LAUGH AND THEN THINK
- K P SREEKUMAR GOT THE PRIZE IN MATHEMATICS
- HE TACKLED THE PROBLEM OF FINDING SURFACE AREA OF AN INDIAN ELEPHENT BY MEASURING THE DIMENSIONS OF ITS FOOT IMPRINT AND GAVE AN EQUATION

KP SREEKUMAR

Won the 2002 Ig Nobel prize for Mathematics for his 1990 paper,

‘Estimation of the total surface area in Indian Elephants’

YOU MAY WONDER WHAT FOR SURFACE AREA OF AN ELEPHENT IS REQUIRED

.WILD ELEPHANTS ROME THE FOREST .THEY ARE ASSETS OF THE NATION.
MANY PROBLEMS ARISE OUT OF THIS.

THEY ENTER NEAR BY VILLAGES IN SEARCH OF FOOD.

THEY OCCASIONALLY FIGHT AMONG THEMSELVES TO DEATH

THEY GET INFECTIONS WHICH CAN BE FATAL.

HENCE FOREST OFFICIALS MONITOR ELEPHANTS AND SEDATE THEM TO GIVE MEDICINES AND RELOCATE THEM.

There are two species of elephents

- Indian elephent differs from African elephant
- **The highest point is the bentback**
- The trunk is longer and curves INWARDS
- **There are five toes in all legs**
- The ears are small compared to the body

For an African elephent

- The highest point is the head
- **Ears are very large**
- Trunk is smaller than elevated body
- **Has only four toes on hind legs**

What is the surface area for?

- Surface area gives the volume of the elephents body
- **Thereby its weight and total body mass**
- When an Elephant has to be sedated the drug administrated is calculated as a fraction of the mass of the animals body
- **An excess drug kills the animal**
- Many animals like elephents are endangered species
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k .p. sreekumar a veternary doctor wanted to study this

- How to estimate the animals body mass with out weighing it
- **He was convinced that all parts of an animals body are proportionally built**
- He wanted to find that proportion between different sizes of animals organs
- **So he measured all parts of Elephents body vis a vis its total volume**

In his homestate KERALA Elephents are found in temples

- Temples also have large number of people who watched this doctor measuring legs ,tail ,ears, trunk etc including the size of
  - the elephent dung
- **They thought he was mad .**
- why on earth he has to measure the length and breadth of the tail and the thing beneath it

Sreekumar's method was laborious.
He divided the elephant's surface into geometric shapes.
The ear, for example, was a triangle, while the tail was a cylinder.
After calculating the areas of about 13 parts of 24 elephants, Sreekumar calculated which parts were best correlated with total area.

Then he used what is called the least squares method to find a formula for total area using only the elephant's height and its forefoot pad circumference.

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- In a daily news paper cartoons were published making fun of the research

Sreekumar became talk of the town

- Every one ridiculed him and his work
- **In a T V quiz programme a question was asked**
- What is the most useless science research done in kerala

Ans was k p sreekumar

Marks was awarded to the answer

Ten years later, Sreekumar still recalls his colleagues' ridicule with hurt.

He was driven to write to the Ig Nobel Association about the unexpected backlash,

and the Committee, in turn, sent him a letter explaining the relevance of his work.

Sreekumar distributed this letter among his hecklers to silence them.

“It shattered me,” says the mild-mannered researcher from College of Veterinary and Animal Sciences in Mannuthy, a suburb of Kerala.

But sreekumar went on with his work

- **Ultimately he published his findings**

  BW=1010+0.036(L X G)
- BW=body weight G=chest girth
  L=length of body
- H=1.60 HEIGHT AT SHOULDER
- **BMI =H X1.60+ 1.99 X FFC**
- **FFC=fore front circumference**
- **SINCE THEN NO ELEPHANT HAS DIED OF SEDATION ANYWHERE IN INDIA**

Veterinary Research Communications, 14 (1990) 5–17

ESTIMATION OF THE TOTAL SURFACE AREA IN INDIAN ELEPHANTS (*ELEPHAS MAXIMUS INDICUS*)

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ABSTRACT

Sreekumar, K.P. and Nirmalan, G., 1990. Estimation of the total surface area in Indian elephants (*Elephas maximus indicus*). *Veterinary Research Communications*, **14** (1), 5–17

Twenty-four adult Indian elephants (*Elephas maximus indicus*) of both sexes and different ages and weights, belonging to the Temple Devaswoms, the Forest Department of the Government of Kerala and the Gemini Circus formed the experimental subjects from which formulae were derived to predict the total surface area from either body measurements or areas of individual regions. Several models, using the parameters studied either singly or in combination, were tried independently for males and females and also for adults irrespective of sex. The best prediction of total surface area (S) in m^2 was obtained for adults irrespective of sex by using the two parameters, the height at the shoulders (H) in m and forefoot pad circumference (FFC) in m in the formula $S = -8.245 + 6.807H + 7.073FFC$. No significant improvement in the accuracy of prediction resulted from the use of the independent best fit formulae for males and females. The conventional method of using the exponential of body weight (kg) for predicting suface area was not found to yield an equivalent accuracy in these animals.

Keywords: biometry, elephant, surface area

INTRODUCTION

Metabolic rate can be expressed as a function of the total surface area during life. Even though expression in terms of body weight is preferred, the customary practice of expressing heat production in relation to surface area (Dale, 1984) is still widely prevalent.

The surface area can be measured directly or it can be estimated by conventional formulae. An attempt was made in the present work to estimate the total surface area of adult Indian elephants with reasonable accuracy and to derive a simple and reliable prediction equation for estimating total surface area indirectly.

MATERIALS AND METHODS

The study was conducted on 12 female and 12 male adult Indian elephants (*Elephas maximus indicus*), varying in age from 18 to 60 years and in weight from 1880 to 5290 kg, maintained by the Temple Devaswoms, the Forest Department of the Government of Kerala and the Gemini Circus. All the animals were clinically healthy and were maintained under an optimal nutritional regime.