

## Aim

To investigate if the max price paid concept can be used, and to find an operant test suitable for elephants, to measure the value of enrichments.

## Materials and method

Two elephants, Saonoi and Bua from Kolmården Animal Park, were used. Two weight machines were welded together, with a total weight magazine of 372 kg. Attached to the machines was a photo cell switch and when the weights were lifted that would release the resource of choice. Different objects were tested to find what the elephants wanted to use when pulling the weights.

Pfeiff's Feeder PE 360 was used to distribute pellets and sugar. A hay net and a tarp, both filled with 5 kg hay, were also tested. To find the max price paid for hay three trials with the tarp were carried out with each elephant with a set weight increase schedule.



## Contact

Mary Holmgren

holmgren79@gmail.com

[http://cms.ifm.liu.se/edu/biology/master\\_projects/2007/mary-holmgren/](http://cms.ifm.liu.se/edu/biology/master_projects/2007/mary-holmgren/)

International Masters Programme in Applied Biology, Linköping University



## Acknowledgments

Many thanks to my supervisor Mats Amundin and to the elephant keepers, Thomas Antmar and Andreas Levestam, for all their assistance. Mikael and Per Cederholm gave important help with the technical equipment. Richard Kirkden gave much appreciated methodological assistance and comments on the manuscript. Nautilus provided with the two weight machines. Finally I am grateful to Kolmården Animal Park for letting me conduct my research in their park.

## References

1. Shepherdson D (1998) Tracing the path of environmental enrichment in zoos pp 1 in: Shepherdson DJ, Mellen JD & Hutchins M (eds) Second nature: environmental enrichment for captive animals. Washington, DC: Smithsonian Institution Press
2. Kirkden RD, Edwards JSS & Broom DM (2003) A theoretical comparison of the consumer surplus and the elasticities of demand as measures of motivational strength. *Animal Behaviour* 65, 157-178
3. Kirkden RD & Pajor EA (2006). Motivation for group housing in gestating sows. *Animal Welfare* 15, 119-130
4. Dawkins MS (1983) Battery hens name their price: Consumer demand theory and the measurement of ethological 'needs'. *Animal Behaviour* 31, 1195-1205

# A method to evaluate environmental enrichments for Asian elephants in zoos



## Introduction

**Environmental enrichment (EE)** is increasingly used to improve captive animals environment. That is good because most zoo animals have a poorer environment than wild ones. However, introducing EEs can be problematic, both practically and financially so before making it permanent it is useful to find out if an animal has any interest in it.

**Maximum price paid** is one measure that can be used to assess what an animal prefer. An operant test is set up where the animal has to perform a task to get access to a resource. Then a cost is imposed upon access until the animal stops "paying". This is seen as the highest price an animal is prepared to pay for a single visit to the resource. It is a straightforward measure that shows if an animal has any interest in a resource at all<sup>2</sup>.

A **comparator** of known value to animals is needed to compare against the resources tested<sup>3</sup>. Food is of basic importance to animals<sup>4</sup> and is therefore very useful.



*The elephants are being trained to pull on the rope by the keepers.*

## Results

A rope with a knot at the end suited the elephants best when pulling. The food dispenser did not work because the sound of it frightened them. The hay net did not release the hay properly but the tarp functioned without any problems.



*Bua is pulling on the rope to receive 5kg of hay*

This is the max the elephants paid for the hay for the different trials :

1. Bua → 245kg      Saonoi → 173kg
2. Bua → 372kg      Saonoi → 173kg
3. Bua → 227kg      Saonoi → 227kg

## Discussion

The **technical solutions** for the operant test required a lot of trial and error. This is partly due to the fact that most of the research done before has been on smaller animals, e.g. hens and minks. Most of the studies also had different solutions on what kind of task the animals had to perform to get access to a resource.

**Max price paid** seemed to work when testing the willingness of the elephants to pull for hay. It should be possible to use this measure to test almost any kind of enrichment that could be valuable for elephants. However, further studies are needed with more resources tested before anything can be said for certain.

## Conclusions

A method has been developed to evaluate enrichments for elephants. The max price paid concept was used and the max price for food was tested. This method can most likely be expanded to measure the relative value of other resources as well.



*The tarp is being loaded with hay.*