Effect of environmental enrichment on behaviour of sloth bears (*Melursus ursinus*)

Zoo biologists around the globe have now accepted the responsibility of collaboration with architects and engineers to design exhibits that enhance the lifestyles of captive animals. Indeed, growing interest among the public in animal welfare demands that zoos carefully consider programmes and techniques that will contribute to the 'psychological well-being' of the entire collection. During the past decade, emphasis in zoos has become increasingly naturalistic, providing opportunities to exhibit and manage animals in appropriate social groupings[1,2].

It is generally recognized that naturalistic functional behaviours can be promoted in confined animals by increasing the physical complexity of their environment with species-appropriate furnishings, and by adopting various methods of feeding that encourage complex feeding behaviours[3–8].

In order to examine the effectiveness of environmental enrichment models and strategies, a study was conducted on 41 sloth bears, *Melursus ursinus* received from Kalandars during December 2002 to May 2003 at the Agra Bear Rescue Facility at Soor Sarovar Bird Sanctuary, Keetham, Agra.

The behaviour of the bears was categorized according to the method proposed by Forthman *et al.*[9]. In this method foraging, locomotion, auto play and all the activities in water, fall under 'active'; resting, alert and routine behaviour fall under 'passive'; some self-stimulating, stereotype or periodic pacing type of unnatural behaviour fall under 'abnormal' categories. Table 1 depicts the comprehensive behaviour observed under the following enrichment experiments.

Elevated wooden platforms: Utilization of the wooden platforms by the bears was 100%. Climbing on platforms give the bears a new dimension to their environment and enables them to escape from potentially aggressive interactions. About 70% of the bears appear to enjoy getting off the ground and viewing their area. Active 82%.

Scented logs: Scented logs with 1 inch/2.5 cm hole drilled into them are filled with small pieces of fruit, seed and insects. Alternatively, one can fill the holes with scented herbs like mint, etc. The size of the hole is important so that the animals do not get their tongue or claws stuck in them. The logs were suspended from the trees using a thick rope, so that the animals keep rolling them around. Active 70%.

Table 1. Percentage behaviour observation (coded as active, passive, abnormal under enriched and un-enriched conditions during December 2002–April 2003)

	Condition		
Experiment	Active	Passive	Abnormal
Enriched	42.6 +	39.6 +	2.5 –
Unenriched	19.3 +	71.5 +	8.2 –

Honey logs: According to Chhangani[10] sloth bears are seen quite often feeding on honey and honey bees in the wild. During this study the honey logs had an interior chamber that can hold bottled honey. The log was hung with a climbing structure in an enclosure with a thick rope. The honey log has a sort of sucking pipe, inviting the attention of the bear to suck honey. A rabbit laboratory water bottle with the top cut-off was used for the sucking process initially. The narrow spout allowed a thin trail of honey to trickle through a small hole drilled in the tree trunk. Once the bottle of honey is placed, the honey log was sealed with a lid. Active 100%.

Natural substrates for instinct behaviour: Normally, bears enjoy digging and removing barks from tree trunks. The response to natural substrate supplements

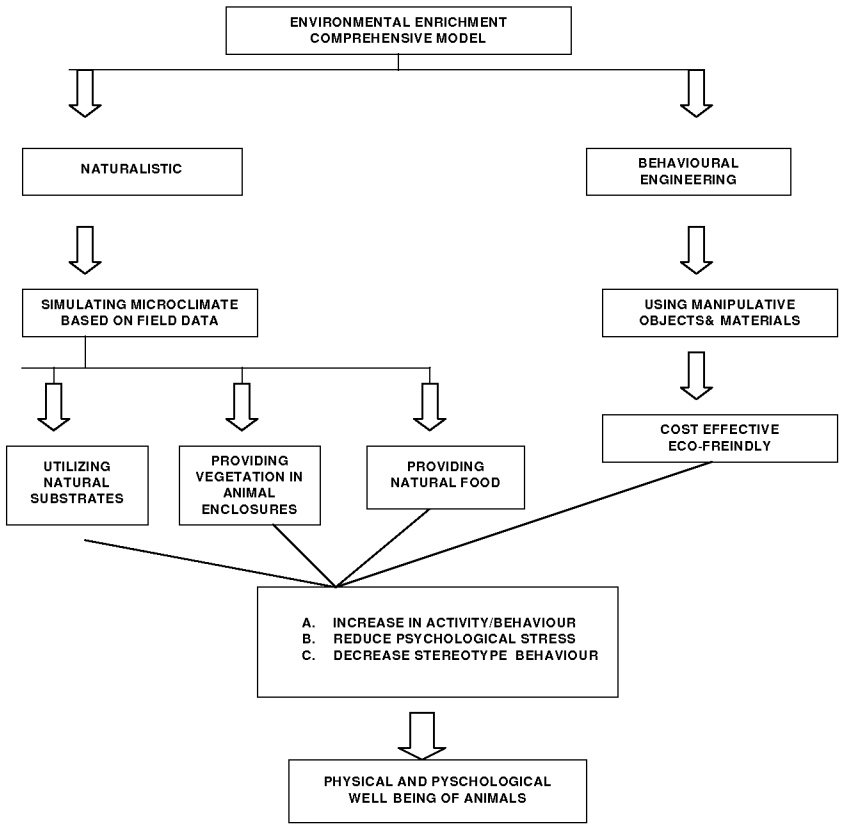


Figure 1. Environmental enrichment model.

such as large wooden logs with barks was good. Active 38%.

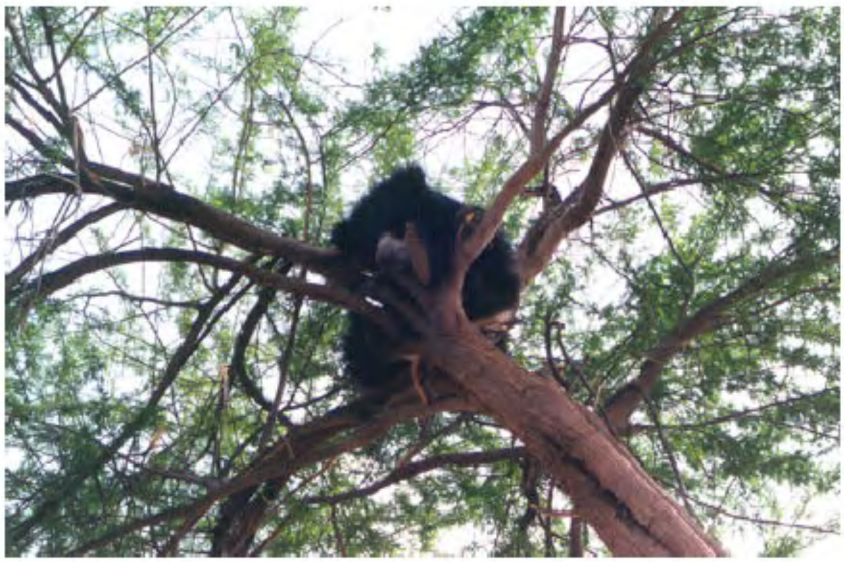
Bedding/nesting material: All bears were provided with straw/hay as bedding/nesting material, which they modified, interestingly, in their own individual pattern. The young bears were keener in this activity. Active 42%.

Scattering of feed: All the bears were provided with groundnuts and seeds in the enclosure, which kept them busy searching of food all around the enclosure. Active 35%.

Water pools: All the bears utilized the small pool provided in the enclosure, as they enjoyed the water by leaping about, splashing and falling, without hurting themselves. Some boulders were placed at the pool base to provide natural grip for climbing out. The maximum depth of the pool was 3 feet at the centre. Active 40%.

During the study period data on behaviour were collected. Each animal exhibit was instantaneously point-sampled using Altman[11] technique in succession at 1 min interval in the same order, with a 1 min break at the end of each set of sample, so that each exhibit was sampled once every 5 min. Profiles for each behaviour differed significantly from each other and chi square test of homogeneity of proportions was used and analysed. Details of data are given in Table 1 and an environ-

Sloth bears feeding on honey from honey log at Agra Bear Rescue Facility. (Photo: Brij Kishor Gupta).



Providing tree and dry branches enables dancing sloth bears to climb upon. (Photo: Brij Kishor Gupta).

Sloth bear searching for scattered and hidden food (Photo: Brij Kishor Gupta).

mental enrichment model is shown in Figure 1.

Today environmental enrichment should be an integrated part of any daily animal routine in any zoo and rescue centres. The enrichment supplements should be kept changing or rotating so that the animal does not feel the boredom of living in an enclosure. The 'enriched' bear is relatively more active and therefore, is less likely to exhibit aberrant stereotype behaviours, and according to Cowan (unpublished) may be less likely to succumb to certain diseases. The traditional method of keeping bears in barren concrete enclosures is no longer acceptable. According to Landrigan *et al.*[12], bears kept in captivity are notorious for exhibiting stereotypes. Therefore, behavioural outcomes are being considered in the design of enclosures.

For the environmental enrichment for captive animals in a rescue centre or zoo, a cost-effective and well-designed enclosure is necessary. This should form a part of the policy of zoos and captive centres. This will provide enrichment devices both stimulus and environment simultaneously for physical and mental acceptance of the enclosures as natural home for the animals.

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