

# II Conferência Brasileira de Enriquecimento Ambiental

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REGIONAL ENVIRONMENTAL  
ENRICHMENT CONFERENCE

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## PROCEEDINGS

### II BRAZILIAN CONFERENCE ON ENVIRONMENTAL ENRICHMENT

**Local:** College of Veterinary Medicine and Zootechnics  
University of São Paulo - Brazil

**Date:** 22-24 October, 2010

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# II Conferência Brasileira de Enriquecimento Ambiental



## Schedule:

October 22<sup>nd</sup> 2010 - FRIDAY

18:30 WELCOME!!!! OPENING DINNER AT THE AQUÁRIO DE SÃO PAULO

October 23<sup>rd</sup> 2010 - SATURDAY

07:30 - 09:00 **Material distribution**

09:00 - 10:00 "Keeper-Animal relationships - how relationships with keepers affect animal welfare, and why keeper-animal relationships need to be studied in zoo and lab animals, and what this means for enrichment and training".

Prof. Dr. Kathy Carlstead - Scientific Director of the Honolulu Zoo

10:00 - 10:20 **Oral presentation 1.** "Behavior management approach to animal welfare" - Valerie Hare (The Shape of Enrichment San Diego, Califórnia)

10:20 - 10:40 **Oral presentation 2.** "Small carnivore husbandry at Port Lympne Wild Animal Park, UK" - Stephen Veen (Wild Animal Park, UK)

10:40 - 11:10 Coffee-break e poster

11:10 - 12:10 Round table: "Is animal conditioning enrichment?????". Valerie Hare - The Shape of Enrichment San Diego, California Biol., MSc, Ph.D Vanessa T. Kanaan - Post doctoral candidate of the Applied Ethology Laboratory - UFSC

12:10 - 13:40 Lunch

13:40 - 15:10 "How enrichment can be used for professional development". Robynn Ingle-Moller, SHAPE-Africa (Co-Chair)

15:10 - 15:40 Coffee-break e pôster

15:40 - 16:00 **Oral presentation 3.** "Components of effective and efficient enrichment planning" - Valerie Hare (The Shape of Enrichment San Diego, Califórnia)

16:00 - 17:00 "Animal welfare and the importance of enrichment in zoos". Prof. Dra. Kathy Carlstead - Scientific Director of the Honolulu Zoo

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October 24<sup>th</sup> 2010 - SUNDAY

**09:00 - 10:00** "Environmental enrichment for pets - relevance for the prevention and control of behavioral problems".

MV, MSc, Daniela Ramos - Ph.D student of the Department of General Practice FMVZ - USP.

**10:00 - 10:20 Oral presentation 4.** "Environmental enrichment as a tool to stimulate species-specific behaviours in tamandua (*Tamandua tetradactyla*)" - Maria Florencia Presa (Biopark Temaiken, Argentina)

**10:20 - 10:40 Oral presentation 5.** "Behavioural study of White-eyed parakeets (*Aratinga leucophthalma*) with psychogenic feather picking disturbance, submitted to environmental enrichment and haloperidol treatment" - Luiz Flavio Telles (UFMG)

**10:40 - 11:10** Coffee-break e poster

**11:10 - 12:10** Lab animals: "We also want enriched environments!"

Biologist Vera Lucia Lângaro Amaral - Universidade do Vale do Itajaí-UNIVALI/SC

**12:10 - 13:40** Lunch

**13:40 - 14:40** "Environmental enrichment for fish and aquatic mammals".

MV, MSc, Ph.D, Cristiane Schilbach. Pizzutto - Post doctoral candidate of the Reproduction Department of the FMVZ-USP, coordinator of SHAPE - BRASIL

**14:40 - 15:00 Oral presentation 6.** "Ethology behaviour of rabbits (*Oryctolagus cuniculus*) kept in cages/pens and preference tests" - Ana Paula Manetta (IPEM)

**15:00 - 15:30** Coffee-break e poster

**15:30 - 15:50 Oral presentation 7.** "Environmental enrichment contributions to the management of inter-dog aggression in shelter dogs" - Oswaldo Santos (ITEC; Universidade Nacional da Colombia)

**15:50 - 16:10 Oral presentation 8.** "Reducing Bumblefoot lesions in a group of captive magellanic penguins (*Spheniscus magellanicus*) employing environmental enrichment" - Laura Reisfeld (Aquário de São Paulo)

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**16:10 - 16:30 Oral presentation 9.** "Evaluation of the influence of food enrichment on the behavior of captive spider monkeys (*Ateles marginatus*) - Ursula Taveira (UEENF/CCTA/LZNA)

**16:30 - 16:50 Oral presentation 10.** "Application of Environmental Enrichment techniques in a group of captive flying foxes (*Pteropus vampyrus*) at the Aquário de São Paulo." - Lygia S. Amaral (Aquário de São Paulo)

**16:50 - 17:10 Oral presentation 11.** "Environmental enrichment actions in a scientific breeding facility of nonhuman primates for biomedical research" - Miguel Ângelo B. Gonçalves (FIOCRUZ)

**17:10 - 17:30 Oral presentation 12** "Olfactory stimulus for captive carnivores". - Juliana C. Padilha (UNESP - Rio Claro)

**17:30 - 18:00** Shape-Brasil: activities, goals and perspective for the future.  
Manuela Gonçalves Fraga Geronymo Sgai - Ph.D student of the Reproduction Department of the FMVZ-USP, SHAPE - Brasil

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## POSTER PRESENTATIONS

# II Conferência Brasileira de Enriquecimento Ambiental



## EFFECTIVENESS OF CARDBOARD BOXES DISCOVERED AND SEMI-COVERED AS ENVIRONMENTAL ENRICHMENT FOR DOMESTIC CATS (*Felis silvestris catus*): A MODEL FOR CAPTIVE CARNIVORES

Oliveira, Adriana Sicuto<sup>\*1</sup> e Genaro, G.<sup>2</sup>

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Domestic cats (*Felis silvestris catus*) are often kept in captive situations or semi-captivity, whether in CCZ's, research labs, animal shelters and even in homes. Still, they can be interesting models to study carnivores in captivity. It is therefore of crucial importance to the constant search of items of environmental enrichment that promote welfare for the cats that fall under these conditions. The aim of the present study was to test the effectiveness of cardboard boxes discovered and semi-covered items such as enrichment when applied in confined space environments. We used eight adult male cats neutered and in an area of 16m<sup>2</sup>, featuring eight cardboard boxes of C45cmxL30cmxA30cm, of which four findings and four semi-covered (open only 15cm). The group of eight animals was filmed in the experimental conditions for 2 hours for 2 consecutive days, in which the positions of the boxes were rotated. The results show that both types of boxes were used significantly by the animals (81% of cats entered in at least one of the boxes), and no significant difference was found between the times spent on the findings and semi-covered ( $x_{disc} = 14.52 \text{ min}$ ,  $\sigma = 26.49$ ;  $x_{semi-cov} = 11.81 \text{ min}$ ,  $\sigma = 18.23$ ). The results confirmed the preliminary hypothesis, since the interest in boxes are very expressive and the environment is already known, which can inhibit a significant preference for half-covered boxes, which promote a social and spatial isolation in new environmental conditions. More tests will be performed to confirm the preliminary results obtained.

**Keywords:** Cats; enrichment; welfare.

Financial support: Capes

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## ENVIRONMENTAL ENRICHMENT FOR AMAZON TREE BOA (*Corallus hortulanus*) AT QUINZINHO DE BARROS ZOOLOGICAL PARK SOROCABA - SP

Rampini, Aline. P.<sup>1</sup>; Pessutti, Cecilia<sup>2</sup>; Nobrega, Hugo<sup>3</sup>.

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Environmental enrichment techniques have been used to create a more stimulating environment for captive animals. In this work, the expansion of the technique was used for reptiles, more specifically two Amazon tree boa (*Corallus hortulanus*) individuals, kept in a terrarium at Sorocaba Zoo, Sorocaba-SP-Brazil. Observations were carried out from 20/08/10 to 14/09/10, totaling 60 hours. *Ad libitum* sampling method was held for 20 hours to prepare the ethogram, and the "scan sample" method was used to record behavioral categories in 1 minute intervals. The implemented strategies were food and structural enrichment. The observed categories were: inactive (IN); exploratory displacement (DE); arboreal displacement (DA), substrate displacement (DS), tongue-flicking (DR) and head movement (CM). During the pre-enrichment, the most significant categories were IN (94.75%) and DA (5%). During the first enrichment, the most observed time frequencies were IN (96.35%), and DA (1.9%), but with an increased frequency of DR (0.99%) and DE (0.49%). As for the second enrichment, it was observed that there was a slight drop in the frequency of IN (94.4%), and the DE category showed an increase of (6.75%). The results showed a low frequency of interaction with the enrichments used. Thus, it is suggested that further observations are made with other types of enrichments and at different times of the day, aiming to increase the species activities.

**Keywords:** Environmental enrichment; snakes; *Corallus hortulanus*; behaviour; welfare.

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## ETHOLOGY EAGLE CHILENA (*Geranoaetus melanoleucus*) IN CAPTIVITY: DIAGNOSIS AND ENVIRONMENTAL ENRICHMENT

Fernandes, Ana Paula de Araújo<sup>1\*</sup>, Prado, Andréa Moraes<sup>2</sup>; Ferreira, Luiza Hishikawa<sup>3</sup>

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One of the best alternatives for achieving the welfare of a captive animal is handling with environmental enrichment. Birds of prey, which live in zoos, rehabilitation centers and centers for screening, record the world in presenting a high incidence of diseases, which cause the bad management in captivity, especially diet, perch and stress. The aim of this study was to evaluate the behavior of the Chilean Eagle (*Geranoaetus melanoleucus*) in captivity, before and during an environmental enrichment in the Municipal Ecological Park, in Southeastern Brazil. Observations were made 24 (12 baseline and 12 experimental) with the method "focal animal" intervals, with records every 30 seconds for one hour. During the experimental phase were used technique of environmental enrichment food as food within the guts of Tenebrio box, nest with eggs, meat pole, kids chicken, rats, chicks and live fish. It was observed that during the experimental phase, there was a decrease of activities in the categories of inactivity, vocalization and alert, and an increase in the categories of activities related to observation and interaction with food. In this study caused physical and psychological stimulation, causing an improvement in conditions behavioral Eagle Chilena (*Geranoaetus melanoleucus*).

**Keywords:** *Geranoaetus melanoleucus*, environmental enrichment.



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## THE USE OF ENVIRONMENTAL ENRICHMENT IN ORDER TO STIMULATE THE SPONTANEOUS USE OF TOOLS IN A GROUP CAPTIVE OF CAPUCHIN MONKEYS (*Cebus apella*) AT THE "BOSQUE GUARANI" ZOO - Foz do Iguaçu, PR

Santos, Anna Cecília Leite<sup>1\*</sup>; Menegusso, Marina Percheron<sup>1</sup>; de Moura, Regina.<sup>1</sup>

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Capuchin monkeys (*Cebus apella*) are animals with a considerably high intelligence among the neo-tropical primates, for they have sharp motor skills and cognitive sense. In captivity, these behaviors are limited and that may result in physical and psychological changes. Through environmental enrichment, the goal of this work was to encourage the spontaneous use of tools, an engaged behavior in free-living *Cebus*. The technique made use of bamboos, drilled and tethered in the compound, containing fruit pulp in its interior, and the availability of sticks with different sizes and thickness. For behavioral records, the sampling method "all occurrences" was used. During the experiment, the following could be observed: use of the stick to remove the pulp by 40%, finger licking 11%, interaction with the stick 48.8%. The use of tools was estimable, with records of interaction with the items by many individuals of the group, the majority of them being females. There were records of ontogenetic processes, through behaviors in which mothers foraged using the tools and the cub tried to do the same. Based on these records, it is believed that the use of environmental enrichment as a stimulus to promote natural postures is considered effective, not only for the purpose of promotion of well-being, but also for the maintenance of typical behavior of the species.

**Keywords:** Capuchin monkeys; tools; environmental enrichment.

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## QUANTITATIVE ANALYSIS OF STEREOTYPICAL BEHAVIORS IN CAPUCHIN MONKEYS (*Cebus Apella*) UNDER ENRICHMENT WITH BAMBOOS IN THE "BOSQUE DO GUARANI" ZOO, FOZ DO IGUAÇU-PR

Santos, Anna Cecília Leite<sup>1\*</sup>; Menegusso, Marina Percheron<sup>1</sup>; de Moura, Regina.<sup>1</sup>

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Capuchin monkeys are animals that have many motor and cognitive skills. In captivity, these skills are limited to physical space and the lack of challenges, what can result in stereotyped behaviors. This study aimed, through environmental enrichment, analyze and quantify stress behaviors in a group of 14 individuals. For behavioral records, the method of "all occurrences" was used. The technique makes use of perforated bamboos containing fruit pulp on their inside, where the animals would have to make use of tools to obtain food. Pre-enrichment, enrichment and post enrichment observations were made, where the following results were obtained: During the "pre" period, the stereotyped behaviors corresponded to 38% of the positions held. When the technique was introduced, during the "enrichment" period, the stress presented was reduced to 17%. Intense use of the available tools to obtain fruit pulp was perceived, as well as an increase in social behavior of the individuals. During the latter part of the work, the "post" period, it was observed that the values of stereotypies increased to 45%. For this period, it was noted that the stereotyped behaviors are consistent with attitudes of only four individuals, although one of these had been satisfactorily interacting with the enrichment. This increase in percentage in the final period of observations is attributed to the fact of the enrichment being removed from the enclosure, what may have caused an increase in stress behaviors. From this premise, it is believed that restructuring the setting or creating permanent enrichments is important for the gradual reduction of stereotypies.

**Keywords:** Capuchin monkey; environmental enrichment; stereotypies; tool.

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## ENVIRONMENTAL ENRICHMENT FOR *Bothrops neuwiedi* (SNAKES: VIPERIDAE: CROTALINAE) AT SOROCABA ZOO - SP

da Rocha Filho, Hugo N.<sup>1</sup>; Pessutti, Cecília<sup>2</sup>; Rampini, Aline P.<sup>3</sup>

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The environmental enrichment practice for snakes is still poorly implemented in zoos. In the present work, carried out at Sorocaba Zoo, Sorocaba-SP, from 10/08/10 to 17/09/10, an ethogram for *Bothrops neuwiedi* was elaborated using the *ad libitum* method for 20 hours. The behavior categories observed were: standing idle PI, motionless tongue flicking DP, tongue flicking in motion DL, terrestrial locomotion LOT, climbing ESC, eating CO, drinking B, attacking BT, yawning BOC, and not visible NV. Two types of enrichment were used, food E1 (problem box with odor and prey), and structural E2 (modification of perches and substrate) for three specimens, totaling 40 hours of observation. The "scan sample" method was used to record the behavior categories in 1 minute intervals. It was observed that during the pre enrichment PE, classes NV 51.94% and 40% PI were more expressive. For enrichment E1 frequencies of time spent in each category were 67.94% in PI, 17.55% NV; 9.83% LOT; 1.94% DP; 1.75% CO; 0.42% BE; 0.25% ESC and 0.22% BOC. During the E2, 49.08% of the time was PI; 23.53% NV; DL 18.5%; 5.36%, LOT; 2.33% DP and 1.11% ESC. The results showed that there was a slight increase in exposure and activity of the animals. We suggest continuing with the implementation of environmental enrichment in order to promote the welfare of the specimens.

**Keywords:** Environmental enrichment; zoo; snakes.

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## DESCRIPTIVE REPORT OF ENVIROMENTAL ENRICHMENT FOR CAPTIVE *Guarouba guarouba* AT SOROCABA ZOO - SOROCABA SP

Torrejón, Carlos Alberto Camán<sup>1\*</sup>; Puglia, Ronaldo Ribeiro Garcia<sup>1</sup>; Pessutti, Cecilia<sup>1</sup>; Muricava, Bruno Minoro<sup>1</sup>.

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The Golden parakeet (*Guarouba guarouba*) is a psittacine endemic to the Amazon region of Brazil and is listed as endangered by the IBAMA. In captivity, they may have behavioral problems due to several factors inherent to being in a restricted environment. Environmental enrichment promotes the creation of an interactive environment, improving the quality of life, which may favor the expression of natural behaviors for this species. This study aimed to track the history of pterotillomania of two specimens kept in PZMQB, that remained separated for medical treatment for two months and after that period, the study, conducted between 25/08/10 to 16/09/10, begun. The enrichment techniques used were: social (social rehabilitation), structural (modifications of perches, inclusion of bushes) and food. The use of the enrichments was measured through an intensity and duration evaluation form, presented by relative frequency. Records were taken three times a day, with an average interval of three and a half hours. The frequency of the interaction intensity for animals 1 and 2 were respectively: no interaction 67% and 33%, low-intensity 67% and 0%, mean intensity 33% and 0%, and high intensity 33% and 67%. Concerning length, animals 1 and 2 showed respectively: no interaction 67% and 33%, average 25% and 0%, and long-term 67% and 33%. We consider that the use of environmental enrichment led to an increased exploration of the environment along with enrichment items, and through indirect observation, a decrease in feather plucking was noted. We suggest that the use of environmental enrichment techniques, in the long term, may offer an improvement in animal welfare and possibly reduce pterotillomania.

**Keywords:** *Guarouba guarouba*; environmental enrichment; pterotillomania; zoological.

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## ENVIRONMENTAL ENRICHMENT FOR TWO SPECIES OF CAPTIVE FELIDS OF THE GENUS *Panthera* (OKEN, 1816)

Silva, Danilo da Costa<sup>1\*</sup>; Serapicos, Eliana de Oliveira<sup>2</sup>; João, Paloma Fernanda<sup>3</sup>

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Big felines are animals that arouse the interest of the public visiting a zoo, however, captivity can often influence these animals' behavior because of its monotonous and predictable environment, preventing natural behaviors due to space constrains. These factors can trigger abnormal behaviors such as stereotypies and negative stress. To alleviate these undesirable behaviors, environmental enrichment is essential for captive species. This present work aimed to study the behavior of two species of captive felines (*Panthera leo* and *Panthera onca*) kept in the Guarulhos Municipal Zoo between February and October of 2009, and also assess the behavioral responses with the introduction of environmental enrichment items. 30 hours of observation were made using the *Ad libitum* method to qualify and make a behavioral spreadsheet, and 240 hours using the focal animal method, which was used to quantify the behavior before, during and after enrichment. During the enrichment phase, the items used involved all categories of enrichment (sensorial, food, social, cognitive and physical). For the two species it was possible to classify ten behavioral categories, 51 behavioral acts for the *Panthera leo* and 61 for the *Panthera onca*. The only abnormal behavior common to the two species was pacing. All individuals interacted with the enrichment, which was beneficial to the animals, since the lions spent less time visible, and the jaguars enhanced social interaction, besides the decrease of the pacing behavior.

**Keywords:** Environmental enrichment; behavior; animal welfare; *Panthera*.

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## STUDY OF THE BEHAVIOR AND ENVIRONMENTAL ENRICHMENT OF *Lontra longicaudis* (OLFERS, 1818) AT BOSQUE DOS JEQUITIBÁS ZOO, Campinas, SP

da Silva, André Sirino<sup>1</sup>; Prado, Marina da Silva<sup>1</sup>; Felipe, Paulo Anselmo Nunes<sup>1,2</sup>;  
Santos, Eliana Ferraz<sup>2\*</sup>.

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The study of the behavior and the development of techniques for animal welfare are important tools for keeping wild animals in captivity. The objectives of this work were to elaborate an ethogram, and apply environmental enrichment techniques for a male *Lontra longicaudis* belonging to the Bosque dos Jequitibás Zoo, Campinas, SP. Using behavior observations through sampling, it was observed that time was spent as follows: feeding (2.53%); interacting with tail (1.54%), with leaves (0.63%) with sticks (1.18%); with the public (3.35%), digging (0.18%), scratching (5.07%); scratching while spinning (0.72%), urinating (0.50%), defecating (0.32%), lying down (3.62%), sleeping (3.98%), sitting (2.90%); hiding food (0.81%), sniffing (2.63%), foraging (1.27%); cleansing body (2.99%); walking (4.98%); running (9.87%), marking (2.63%), swimming (30.34%); floating while swimming (0.99%); swimming backstroke (1.81%); "screw" swimming (1.45%), sentinel (3.44%); drying (2.08%); vocalizing (2.08%), and out of view (6.07%). Of all enrichment techniques employed, three showed a better effect in the alteration of the initial ethogram patterns: introduction of trunks and stack of dry leaves in the exhibit (physical enrichment), chicken neck in ice blocks on the enclosure's pool (food enrichment), and a forty-foot clothes line with seven colored hula hoops hanging over the pool (physical enrichment). For the interventions described above, the animal presented two different behaviors of vocalization and posture (moved the body several times back and forth), which were not observed during the initial ethogram, which suggests that the enrichments used may increase the behavioral repertoire of the captivity species.

**Keywords:** Behavior; ethogram; environmental enrichment; *Lontra longicaudis*; zoo.

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## ANALYSIS OF ENVIRONMENTAL ENRICHMENT FOCUSED ON REDUCING STRESS IN COATI (*NASUA NASUA*) CAPTIVES OF THE ZOO BOSQUE GUARANI, FOZ DO IGUAÇU, PR

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The coati, *Nasua nasua*, is a medium-sized carnivorous mammal belonging to the family Procyonidae, on which there are few studies. In Foz do Iguaçu (Paraná), this mammal happens in large numbers within the National Park. It is known that captive animals do not usually engage in behaviors that express the wild, resulting in physical and psychological problems. The animal kept in captivity at the zoo Guarani (Iguassu Falls), has high levels of stress. The objective of this work was to evaluate the reduction of stress in two male coatis, using the method "all occurrences". The animals were observed for 90 hours, and it was noticed that the daily pattern of activity showed significant variations, often in transportation (33.5%), foraging (13.14%), vocalization (15.1%) and spraying (15.0%). The technique used as enrichment for this study was: use of banana leaves and a string involving food offered by the zoo, in order to increase the feeding time of coatis, observing that before the technique were spent two minutes and an average of 15 minutes. In the period without technique there was an average of 29.2% of stereotypies, however, when the technique was introduced, these behaviors decreased to 5.9%, resulting in a significant reduction of 23.3%. The result can be attributed to the fact that in the wild, these animals use about 90% of daily activity spent on foraging, which led to the attempt, by the technique used, to provide greater foraging activity of these animals in captivity.

**Keywords:** Coati; stereotypies; environmental enrichment.

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## ANALYSIS AND EFFECTIVENESS OF ENVIRONMENTAL ENRICHMENT BETWEEN DIFFERENT PSITACID SPECIES AT FOZ TROPICANA BIRD PARK - IGUASSU FALLS, PARANA.

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Environmental enrichment is a principle of animal management focused on improving the care quality for captive animals, their life condition and their welfare. This management can provide a more stimulating and provocative environment, allowing animals to express natural behaviors of the species. This article has used nine different environmental enrichments, offered to captive animals from a enclosure with seventy-three psitacids distributed in thirteen different species in Foz Tropicana Bird Park. Behavioral data were categorized and recorded in an ethogram from the *ad libitum* method. The effectiveness was measured through the interaction of birds with the enrichment where three different scales were use to analyze the target behavior, number of visits and changes in the structure of enrichment. The observations, which occurred preliminary and during the enrichment, were recorded continuously for one hour at intervals of ten minutes. The effectiveness was evaluated by comparing the behavioral response of animals during the preliminary observation and during the execution of the enrichment. The preliminary observation of the afternoon had more variation of behaviors. From the enrichments was noticed an increase of calm, foraging, hygiene, calm interaction and gnaw perch and a reduce of behaviors such as gnaw grille, aggressive interaction and pendulum. The enrichments Melon and coconut, Surprise box and Corn mobile were more effective than others. An increase of interactions of smaller psitacids with the enrichment and also interspecific interactions was observed.

**Keywords:** Psitacids; environmental enrichment; animal behavior.

Financing agencies: Foz Tropicana Bird Park.



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## FEEDING ENRICHMENT FOR CAPTIVE DOMESTICS CATS (*Felis silvestris catus*)

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Enriching the environment of captive animals is fundamental to the maintenance of welfare, and to encourage specific and necessary behaviors for the species, psychologically and physiologically. This study aimed to determine whether, within a group of domestic cats (*Felis silvestris catus*) kept in captivity there are differences in the interaction with food enrichment, and whether these differences are related to the hierarchy of the group. Eight animals were used, four females and four males (castrated) maintained in an environment of 16m<sup>2</sup> during the test. Three items of beef (type: chuck) of 700g each, were suspended by a steel cable and, simultaneously, disposed to the group for two hours. The observations were analyzed through the focal animal method, with continuous recording, using the following variables: latency to contact the item and the interaction time (seconds). Preliminary results have showed that there is a division within the group, concerning the interaction with the items. Two animals demonstrated being "more interactive", both for latency ( $\bar{x} = 0$ ) and for interaction time ( $\bar{x} = 2489 = 1288$ ), in seconds, while the remaining six individuals had latency ( $\bar{x} = 434 = 1045.40, 92$ ) and interaction time with the item ( $\bar{x} = 23.40 = 7.59$ ). Thus we conclude, preliminarily, that there is a difference in the relation of this interaction item and the animals of this group. It may reveal a possible dominance of more "interactive" on "less interactive" members, stressing that these ones need more time to approach the enrichment item, and thus may be benefited, in the same magnitude as the dominant animals are.

**Keywords:** Food enrichment; welfare; cats; captivity.

Financial support: CAPES.

# II Conferência Brasileira de Enriquecimento Ambiental



## ENVIRONMENTAL ENRICHMENT TECHNIQUES USED FOR MAGELLANIC PENGUINS (*Spheniscus magellanicus*) AT THE AQUÁRIO DE SÃO PAULO

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One of the most important behavior patterns of the Magellanic penguin (*Spheniscus magellanicus*) is that they spend around 80% of their time foraging through the Southwest Atlantic. When in captivity, penguins develop more sedentary habits, followed by behavioral changes including reduced time spent in the water, which can lead to clinical problems, mainly bumblefoot. Daily environmental enrichment techniques were used to stimulate the animals to stay for longer periods of time in the water at Aquário de São Paulo. Data from five Magellanic penguins was recorded for one year. Enrichment items included colored plastic balls and rings, ice blocks with fish, live fish, soap bubbles, colored hula-hoops, nature sounds, shells, pebbles and rocks. Only two items were offered each day. Notes on the interaction and preferences were registered during all enrichment sessions. Preferred items included live fish, ice blocks containing fish, and colored plastic balls and rings. After the routine introduction of environmental enrichment, it was observed that the animals were spending more time in the water and interaction between the individuals had increased, suggesting better quality of life in captive conditions.

**Keywords:** Penguins; captive; environmental enrichment.

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## ENVIRONMENTAL ENRICHMENT TECHNIQUES USED FOR A LESSER ANTEATER (*Tamandua tetradactyla*) PUP AT THE AQUÁRIO DE SÃO PAULO

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Environmental enrichment aims to improve the quality of life of captive animals, identifying and promoting the stimulus that is necessary for the species to demonstrate its ideal behaviors. With creative and innovative techniques, environmental enrichment keeps the animals busy for longer periods of time, increasing its behavioral diversity and providing more stimuli and responses to its environment. This work had the objective of increasing the behavioral variability and the exhibit's exploration by a hand-reared lesser anteater (*Tamandua tetradactyla*) pup, at the Aquário de São Paulo. Behavior records were done by focal sampling, with 30 second intervals, summing 20 hours, before the exhibit suffered any alterations. One of the observed behaviors was excessive licking of the paws and genital and little exploration of its environment. The animal's exhibit received ropes, bridges made from fire hoses, and hammocks. The food was offered with presentations differing from the usual: frozen, box with termites and ants, whole fruits, and ping pong balls filled with food hanging from the trees. As partial results, it was clearly observed that the exhibit's exploration increased so as foraging, and a decrease in the licking behavior. This leads us to believe that the effectiveness of the environmental enrichment techniques brought improvements to this animal's quality of life.

**Keywords:** Lesser anteater; captivity; environmental enrichment; behavior.

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## ENVIRONMENTAL ENRICHMENT FOR CAPTIVE WOOD-STORK (*Mycteria americana*) AT PARQUE ZOOLOGICO MUNICIPAL QUINZINHO DE BARROS (PZMQB) - SOROCABA, SP

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There are two wood-stork individuals (*Mycteria americana*), living in PZMQB (Parque Zoológico Municipal Quinzinho de Barros), housed in a 17,30m x 5,75m exhibit with a king vulture (*Sarcoramphus papa*). The exhibit is surrounded by two other exhibits housing a cape barren goose (*Cereopsis novaehollandiae*) and maguari stork (*Ciconia maguari*), separated by grills. In order to reduce stress and provide welfare to both individuals of *Mycteria Americana*, environmental enrichment items were placed in the enclosure (piassava fiber curtain, and live fish, such as fish and insects). 20 hours of *ad libitum* observation were made to elaborate de ethogram, where 29 behavioral categories were described. Having these results, the scan method, with 30 minute sessions, was used to record individual behavior, totaling 24 hours of pre-enrichment ethogram. Until the present moment, 20 hours were recorded in ethograms during the enrichment. With the piassava fiber curtain placement in critical spots (where there are agonistic relations with the neighboring species) there was a decrease in stress behaviors presented by individual 1 (1.35% increase in the amount of time spent on the spot). After introducing live fish in the exhibit's pond, the results from the birds' interaction with the fish were 77.5% for individual 1 and 14.17% for individual 2. Despite this environmental enrichment research still being in progress, behavioral changes were already observed in individual 1, signaling an improvement in the animal's welfare.

**Keywords:** *Mycteria Americana*; stress; environmental enrichment.

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## USE OF PAIRING TECHNIQUE TO MINIMIZE SELF-INJURIOUS BEHAVIOR IN CYNOMOLGUS MONKEY (*Macaca fascicularis*)

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Abnormal behaviors may vary from more intense body activity and self-directed stereotypes to self-injurious behaviors. Non-human primates have a strong social disposition, thus, companion is a crucial factor for their behavioral health and emotional well-being. Hence, pairing is an important environmental enrichment technique for these animals. This summary reports the use of pairing aimed to minimize self-injurious behavior in an adult, male cynomolgus monkey (*Macaca fascicularis*), housed in an individual cage. In order to decrease the aggressive behaviors, environmental enrichment items were offered, positive reinforcement training was conducted and the size of the enclosure was increased. A juvenile, male primate was selected for the pairing. For the first five days, the enclosure remained divided by a stainless steel plate, allowing vocalizations between the two. The plate was replaced by a grid, which also allowed visual contact. The removal of the plate occurred after two days, since there was no demonstration of aggressive behavior. To confirm that a relationship was established, forming a new pair, grooming behavior and teamwork were observed among the individuals, which were also feeding comfortably in each other's company. Besides, they assumed defensive positions and/or vocalizations, both towards the observer, as towards other animals. By the end of the first day, there was an approximation of the animals and grooming behavior. During stressful events, the adult showed aggressiveness (vocalizations, exposure of canines and light bites). At times when these behaviors occurred more frequently, the pair was separated. It was found that through pairing, the self-injurious behavior decreased in frequency and severity.

**Keywords:** Pairing; environmental enrichment; self-injurious behavior; stereotype; *Macaca fascicularis*.

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## ENVIRONMENTAL ENRICHMENT AS MEANS TO PROMOTE ANIMAL WELFARE IN CAPTIVE RED-BELLIED PIRANHAS (*Pygocentrus nattereri*)

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Environmental enrichment has been used as an important and effective tool to provide animals in captivity with a more complex environment and one closer to the habitat it would find in the wild. Thus, having the animals attempt more natural and diversified behaviors more often, indicating welfare and health. With the objective of evaluating the influences of environmental enrichment techniques applied on a group of four red-bellied piranhas (*Pygocentrus nattereri*), at the Aquário de São Paulo, we assumed that it is essential to know the biology of the species and the habits and behaviors of the individuals to whom the enrichment is being directed to. The ethograms were done using the focal sampling method, with records taken every minute. Through this, 40 hours of observation were carried, with 20 being done before the enrichment and 20 during the enrichment. Food and structural enrichment techniques were developed. As structural enrichment items, mirrors and fake fish were used; as food enrichment items, malleable plastic grids for the confection of feeders, hanging meat mobiles and meat pieces involved it pig gut were used. The results pointed an increase in the animals' activity both individually and as a group, with a significant increase in the frequency of longer and faster swimming patterns. Some individuals expressed protective behaviors toward the fake fish, challenging the social structure observed before the enrichment, which has become more dynamic and less rigid. We believe that the enrichment made the red-bellied piranhas' environment into something more interactive and stimulant.

**Keywords:** Environmental enrichment; *Pygocentrus nattereri*; animal welfare; behavior.

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## EVALUATION OF THE INFLUENCE OF ENVIRONMENTAL ENRICHMENT ON THE BEHAVIOR OF *Hippocampus reidi* ( LONGSNOUT SEAHORSE) IN CAPTIVITY

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The environmental enrichment has the function of increasing the psychological welfare of the animal by providing a complex environment that offers the necessary stimuli for the animal to demonstrate their natural behavior. The aim of this study was to develop effective techniques of environmental enrichment for the longsnout seahorse (*Hippocampus reidi*) and to evaluate the influence of these techniques in his behavior. The behaviors were recorded in ethogram for fish by the focal sampling method of interval of time every one minute, totalizing 20 hours of observation before the enrichment and 20 hours during the enrichment. The following items of enrichment were used: transparent balls and straws with holes for supplying of *Artemia* in food, dark plastic plates on the sides of the aquarium, floating bead rings and artificial shells, seaweed and holdfasts. The results showed increasing of his activity with increasing of exploratory behavior, swimming and foraging. There was decreasing of attachment to another seahorse. The animals preferred attachment on enrichment items located on the bottom instead of the surface of the aquarium. It was realized a follow-up of the colouring of the individuals, in which there was color change according to the environment and the enrichment used.

**Keywords:** Enviromental enrichment; behavior; *Hippocampus reidi*; mimicry.

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## USE OF OPERANT CONDITIONING WITH POSITIVE REINFORCEMENT AS A TOOL TO HUSBANDRY OF A GROUP OF CAPTIVE FLYING FOXES *Pteropus vampyrus* AT THE AQUÁRIO DE SÃO PAULO

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Conditioning has been used as a form of environmental enrichment. It enhances the social interaction, improves the professional and animal relationship and reduces stress, making husbandry and clinical procedures easier. In this work, seven flying foxes (*Pteropus vampyrus*) in captivity at the Aquário de São Paulo were studied. Operant conditioning with positive reinforcement was performed three times a week in sessions of 30 minutes. The verbal commands were: "wing", "stethoscope", "mask" and "touch". Whenever the animal answered correctly to the command, it received a clicker signal (auditive reward) and a piece of its favorite fruit. The results showed great individual variation regarding learning time, which seems to be related to the temperament of each animal. It was observed that after the introduction of conditioning to this group, social interaction was increased and that agonistic behaviors were decreased. Considering the impact of conditioning in animal care and welfare, it is important to know what conditioning represents. The answer is nothing but teaching. We teach the animal how to make certain moves, how to stay in a certain position or to tolerate a stimulus. Teaching and conditioning requires an animal that is willing to participate in the process.

**Keywords:** Operant conditioning; *Pteropus vampyrus*; flying-fox; animal welfare.

**Acknowledgment:** Mr. Anael Fahel and Aquário de São Paulo.



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## THE USE OF ENVIRONMENTAL ENRICHMENT AS A TOOL FOR THE PROMOTION OF THE WELFARE OF CAPTIVES INDIVIDUALS OF PANTHER (*Puma concolor*) (LINNAEUS, 1771)

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This project was developed at cats' section of RioZoo Foundation, located in Parque da Quinta da Boa Vista, Rio de Janeiro. Aiming to promote the welfare and stimulate the occurrence of typical behaviors of the panther species, *Puma concolor*, has prepared a draft environmental enrichment for two adult females of this species, in which the animals were free to choose to interact or not with the items offered. The enrichments were placed in strategic locations, which enabled the achievement of physical and sensory activities such as hunting and sniffing respectively. The ethological methodology was used for focal range, with two hours of observation and 30 seconds apart. The data collections were conducted once a week and the experimental period divided into two phases, the first without and second with enrichment. Each animal was observed 10 hours at each stage, totaling 40 hours of behavioral observations. Were offered five different enrichments, classified in feed and sensory categories. These items were made by hand with the use of diet food of the animals, as well as recyclable materials and low cost, such as pet bottles, tires, rope, boxes and bags, leaves and twigs. As a result, a reduction in the proportion of occurrence of the categories lying, idle and floor/grade and increase in the proportion of use of ground, which proves that enrichment increased the rate of activity and exploration of the enclosure.

**Keywords:** Environmental enrichment; *Puma concolor*; behavior; welfare.

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## THE USE OF ENVIRONMENTAL ENRICHMENT WITH BROWN BEAR (*Ursus arctos*) (LINNAEUS, 1758) FOR REDUCING STEREOTYPE

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This study was conducted with a sample of brown bear (*Ursus arctos*), adult, originally belonging to the circus and currently owned to Zoo Foundation of Rio de Janeiro. One of the behavioral aspects that led us to make this work was the high rate of rubbing head to side by side on the grill door for a long period of time. Aiming to minimize the occurrence of stereotyped behavior, an environmental enrichment project was developed. Were records behavioral achieved through continuous sampling methodology over periods of one hour, twice a day, before and after enrichment totaling 18 hours. The enrichments used were of sensory and food kind with edible items or sensory stimulants frozen. The results showed a marked reduction of approximately 52% of the occurrence of abnormal behavior. It was also observed that environmental enrichment allowed greater exploitation of the enclosure, stimulation of playing with tires and tree trunks found on the enclosure. Before this, we conclude that the enrichment techniques favored the demonstration of behaviors most characteristic of the species and this aspect is very important to the welfare of animals kept in captivity.

**Keywords:** Environmental enrichment; *Ursus arctos*; stereotypy; welfare.

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## EARLY DEVELOPMENT OF PIABANHA FISH (*Brycon insignis*) FROM PARDO RIVER, SOUTHEASTERN BRAZIL

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The knowledge of the early stages of embryonic development of fish is extremely important for the study of native species with potential for commercial breeding, since it allows the establishment of directions for their reproduction and culture. Among these species there is the piabanha (*Brycon insignis*), fish of great economical potential due to the quality of its meat and its fishing appeal. Aiming to understand these stages in this animal, this project analyzed twenty-five embryos in different developmental stages: cleavage, morula, gastrula, neurula, embryo, larva, post-larvae and fingerling. At  $60 \pm 5$  minutes after fertilization, the cleavage process occurred and at  $94 \pm 3$  and  $113 \pm 10$  minutes, the formation of morula and gastrulation were completed, respectively. The blastopore closure was observed after  $240 \pm 12$  minutes, while the hatching occurred at  $1218 \pm 27$  minutes after fertilization, followed by mouth opening at  $2280 \pm 35$  minutes. However, the transformation to fingerling occurred only at  $5640 \pm 240$  minutes after fertilization. The morphological events recorded during the embryogenesis of piabanha fish were similar to those found in other fish of the same family in different water basins. To reduce cannibalism after mouth opening, cultivation of plankton was carried out, the fish in order to search for your own food since the incubation period, identifying the following proportions of zooplankton populations: rotifers 58%, cladocerans 13%, and copepods 29%. This practice can lead to improvements in the fish stocking conduct, causing animals to have easy adaptation to the environment.

**Keywords:** Embryonic development; larval stages; piabanha; *Brycon insignis*.

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## CONDICIONAMENTO OPERANTE DE LONTRA NEOTROPICAL *Lontra longicaudis* (Olfers, 1818) NO AQUÁRIO DE SÃO PAULO

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Otters are mustelids that inhabit different aquatic environments. They occur in all continents, with the exception of Oceania. The Neotropical river otter (*L. longicaudis*) can be found from Mexico to Argentina, occurring in almost all Brazilian territory. There is little information about their biology and conservation, making it difficult to draw up measures for their husbandry and conservation. The use of conditioning techniques has been of great importance to promote the welfare of captive animals. This study aimed to use operant conditioning as a tool to improve husbandry of a couple of Neotropical otters at the Aquário de São Paulo. The animals had 10 minutes sessions of operant conditioning with positive reinforcement, on alternate days and times. A target, a clicker and palatable food rewards were used in the sessions. Until now, the behaviors achieved are: "nose" (nose touching the target), "stay" (stay still), "mask" (putting nose on anesthesia mask) and "scale" (get on the scale). These behaviors are performed to assist with daily husbandry routine and veterinary procedures. The animals have different temperaments: the female shows a high degree of dispersion, but has great capacity for learning, while the male appears to be much more focused and interested in the sessions, but does not show the same response to commands when compared to the female. The operant conditioning made husbandry easier, once that trained animals usually have more confidence in their keepers and learn to cooperate in routine procedures.

**Keywords:** *Lontra longicaudis*; operant conditioning; husbandry.

# II Conferência Brasileira de Enriquecimento Ambiental



## APPLICATION OF ENVIRONMENTAL ENRICHMENT TECHNIQUES FOR THE APPROACH OF TWO COUPLES OF NUTRIA (*Myocastor coypus* - Rodentia: Mammalia) IN THE AQUARIO DE SAO PAULO EXHIBITION

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The family Capromyidae (Rodentia: Mammalia), has three genus already extinct, however, only the genus *Myocastor* occurs in Brazil, with only one living species, *Myocastor coypus*, known as nutria. Social organization is not enough known in this species. The introduction of a new individual is a tense process for wild species, but in a Zoo it can be traumatic or deadly. This study aimed to do the safety approach of a young couple of *Myocastor coypus* (Nutria) with an adult couple of the same species, living in Aquario de São Paulo, using environmental enrichment techniques. The process of approximation between the couples was divided into four steps ("introduction door", "absent exploration method", "introduction cage" and environmental enrichment). The fourth step was the final release of the two couples in the exhibition with the environmental enrichment program, which showed up more efficient, reducing aggressive behavior and bullying, resulting in a successfully approach. It was observed increased behavioral variability of animals, the increase in exploratory and manipulative behavior.

**Keywords:** *Myocastor coypus*, environmental enrichment; approach.

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## ORAL PRESENTATIONS

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## ENVIRONMENTAL ENRICHMENT AS TOOL TO STIMULATE SPECIE-SPECIFIC BEHAVIOURS IN TAMANDUA (*Tamandua tetradactyla*)

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The present study was realized at the TEMAIKEN Species Reproduction Center with two adult tamanduas, one female and one male. Both animals presented Dermatitis (*Malassezia sp.*) in different parts of the body causing intensive scratching. They were housed in an exhibit with 11 m long x 4, 20 wide x 2, 30 high, having an open area with vegetation (*Phyllostachis aurea*) and logs on the ground and an internal enclosure (holding area) where they are housed at night. Besides maintaining records to categorize the individuals' behaviors, an intensive study about their biology (environmental, nutrition, etc) was conducted, followed by an exchange of information concerning this species' husbandry in different institutions. This information was then considered to modify the exhibit according to the species' needs. Accordingly, it was decided to change the distribution of the vegetation to achieve more light, place nests, suspended tree trunks, and tall trees, in order to give them different layers and substrates. Inside the holding area, a suspended tree trunk circuit was placed with natural nests inside hollow logs. Besides that, enrichment items were also offered to stimulate smell, touch (objects with different textures), and taste (adding new food). Environmental enrichment not only improved the quality of life of our animals, but it also stimulated the development of specie-specific behaviors, such as the birth of a new pup during the study.

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## OLFACTORY STIMULUS FOR CAPTIVE CARNIVORES

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Olfactory stimulus influences the behavior of many species and is considered an effective form of environmental enrichment for captive animals. The application of these on the environment encourages exploration and marking behaviors, in addition to being excellent olfactory and gustatory stimulus without interfering with the animal's diet. Investigating the behavior of 18 individuals of the Municipal Zoo of Piracicaba, we extended the sampling to 58 individuals of 10 species of the families: Felidae, Canidae and Procyonidae in three zoos in the state of São Paulo. The baits used were Canine Call and Russ Carman's Pro's Choice. Baits were presented separately for each individual in the same sequence. After placing two drops of the bait into the enclosure, the behaviors of the animals in relation to the bait and the time spent investigating were observed and recorded by focal animal sampling for one hour. Time spent investigating was highly variable among individuals of the same species, reaching a maximum of 80% of the time. 22 different behaviors were observed, the most frequent was rubbing the bait to their body parts which are rich in scent glands. Urinating, defecating and spraying urine may be considered coverage behavior, and so scent marks. All are reported in the literature for free ranging animals. This new sample adds two behaviors, and shows that some are exclusive of each species, such as "handstand" in female bush dogs, and "pick up and rub" and "rub on the testicles" in coatis. These results confirm the great potential of odor stimuli as environmental enrichment.

**Keywords:** Scent baits; behavior; scent marking; enrichment.



# II Conferência Brasileira de Enriquecimento Ambiental



## REDUCING BUMBLEFOOT LESIONS IN A GROUP OF CAPTIVE MAGELLANIC PENGUINS (*Spheniscus magellanicus*) EMPLOYING ENVIRONMENTAL ENRICHMENT

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Captive penguins are prone to bumblefoot lesions due to sedentary habits, changes in normal activities patterns, prolonged time in hard and abrasive surfaces, and less time spent swimming and in the water. Environmental enrichment allows the use of creative and ingenious techniques that aim to keep captive animals occupied and with a greater diversity of behavioral opportunities, always respecting the ethological needs of the species. The main goal of this work was to use environmental enrichment techniques to reduce bumblefoot lesions in a group of 5 captive penguins that were showing bumblefoot lesions. All animals were physically restraint 3 times a week, during 12 weeks, to monitor the lesions. For each foot (right and left) 3 measures were established (lesion size: vertical border to border, horizontal border to border and foot size). The environmental enrichment was introduced daily in the water with the goal of enhancing their time in the water for one extra hour daily. The results showed that, after 12 weeks, 4 animals showed significant reduction of the lesion ( $P < 0,05$ ) in both feet, regarding that 2 of them had the lesions completely healed. The animal that didn't interact with the enrichment showed a significantly growth in the lesion of both feet. The size of the feet showed significant statistic difference for 2 animals. With these results we can conclude that an aquatic environmental enrichment for this group of penguins allowed them to spend more time in the water, favoring the reduction of the bumblefoot lesions. We believe that using environmental enrichment can be a tool of great use in providing a better life quality for captive penguins as well as helping prevent bumblefoot.

**Keywords:** Magellanic penguins; captive; *bumblefoot*; environmental enrichment.

# II Conferência Brasileira de Enriquecimento Ambiental



## BEHAVIOURAL STUDY OF WHITE-EYED PARAKEET (*Aratinga leucophthalma*) WITH PSICOGENIC FEATHER PLUCKING DISTURBANCE, SUBMITTED TO ENVIRONMENTAL ENRICHMENT AND HALOPERIDOL TREATMENT

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Psychogenic feather plucking is a relatively common behavioral disorder in psittaciform birds subjected to stressful conditions in captivity. The present study aimed to evaluate the effectiveness of environmental enrichment methods and haloperidol administration to control feather plucking in white-eyed parakeets kept in captivity. Three groups were formed with six white-eye parakeets (*Aratinga leucophthalma*). Group 1 was treated with haloperidol (G1), Group 2 was subjected to environmental enrichment (G2) and Group 3 (G3) had parakeets without the feather plucking disorder. The behavioral study was conducted using ethograms, for instantaneous behavior records through the scan sampling method, at three different times: before (1<sup>st</sup> stage), during (2<sup>nd</sup> stage) and after (3<sup>rd</sup> stage) treatment. In addition, pictures were taken in order to subjectively assess the plumage, using a score from 0 to 10. The observations showed that the parakeets from G1 significantly reduced the activity, increasing the time spent standing on the perch and also reduced the expression of the other behaviors. The G2's parakeets showed similar behaviors to the G3's birds. No parakeets from G1 showed improvement in the plumage quality. However, in G2 only one individual did not show improvement in the plumage's condition. Thus, the use of environmental enrichment promoted better animal welfare condition and provided the growth of new feathers in the plucking areas, unlike the observations made of the psychogenic feather plucking birds treated with haloperidol.

**Keywords:** Feather plucking; haloperidol; environmental enrichment; *Aratinga leucophthalma*; animal welfare.

# II Conferência Brasileira de Enriquecimento Ambiental



## ENVIRONMENTAL ENRICHMENT ACTIONS IN A SCIENTIFIC BREEDING FACILITY OF NONHUMAN PRIMATES FOR BIOMEDICAL RESEARCH

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The Nonhuman Primates Breeding Service (SCPRIM), of the Laboratory Animals Breeding Center at Fiocruz, has a specific animal collection for biomedical researches conducted at the institution. The Environmental Enrichment Program (EEP) seeks the psychological and physiological well-being of the animals, in an attempt to minimize behavioral deviations associated with captivity. Thus, it is designed to achieve the quality standards of the nonhuman primates' colonies used as models for experimental research protocols for the development and control of vaccines, as advocated by the World Health Organization (WHO). Above all, an enrichment program should establish a goal to be achieved through its implementation, aiming to determine which type of enrichment should be applied. Otherwise, the offer of enrichment alone, without direction, may produce unsatisfying results. Besides attending to animal welfare, the EEP undertakes joint actions with a professional training program and technological development of Fiocruz, with activities related to Environmental Enrichment (EE), such as: awareness and professional training, technical support to nonhuman primates' research projects, an educational program with internships for undergraduate students, post graduation projects and product development (patented). The EEP seeks to meet the ethological needs of the species bred at the SCPRIM, and, therefore, uses many types of stimuli and EE. Despite being considered a valuable tool for the animal welfare, the importance of EE needs further dissemination in the scientific community.

**Keywords:** Environmental enrichment; welfare; nonhuman primates.

# II Conferência Brasileira de Enriquecimento Ambiental



## ENVIRONMENTAL ENRICHMENT CONTRIBUTIONS TO THE MANAGEMENT OF INTER-DOG AGGRESSION IN SHELTER DOGS

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Dog Population dynamics in shelters often requires grouping individuals and change the composition of those groups. We developed a protocol to maximize the positive effects and reduce the negative effects (ex. bite accidents) associated with grouping dogs. Twenty-three sterilized dogs that had to be grouped participated in the study. Fourteen were adult females, seven were adult males and one was juvenile female. To promote the welfare of the dogs involved, the protocol was divided into phases that allowed the deployment and the coupling of environmental enrichment (occupational, social, nutritional and sensorial) and behavioral modification (systematic desensitization and counter-conditioning). There were no fights involving bites during the formation of groups. In seven (23%) of pairs formed we observed unidirectional manifestations of aggression that did not involve physical contact. In one of the pairs (3.3%) we saw bidirectional aggression manifestation involving physical contact but no bites. The proposed protocol is a viable alternative to group dogs in the context of Latin America shelters. Besides serving to group the animals, the protocol has the potential to promote wellness, enhance production of desirable behaviors and decrease the presence of behavior problems.

**Keywords:** Dog; shelter; bites; environmental enrichment and behavioral modification.

# II Conferência Brasileira de Enriquecimento Ambiental



## SMALL CARNIVORE HUSBANDRY AT PORT LYMPNE WILD ANIMAL PARK, UK

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Port Lympne Wild Animal Park in Kent, UK, is internationally renowned for the breeding success had with small felids, including the South American Ocelot (*Leopardus pardalis*) and Margay (*Leopardus wiedii*) which have been housed for 25 and 11 years, respectively. Since being established in 1973, the zoo's enclosures and husbandry methods have been constantly refined resulting in a prolific breeding record with small cats. In the last 20 years there have been well over 200 successful births, including 15 Margay and 24 Ocelot. Providing densely planted areas, a number of nesting sites and visual barriers, enabling the animals to utilise all available space within the enclosure, plus varied feeding times and a diverse diet are just some of the things that have gone towards encouraging natural behaviours in our animals. These naturally elusive species remain more inclined to stay visible to the public through an increased sense of safety. The aim of this presentation is to review these aspects of enclosure design and promote discussion on how small felids are currently being housed, with a view of what improvements are necessary to further enhance their welfare in captivity.

**Keywords:** Carnivore; welfare; husbandry; enrichment; enclosure design.

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## BEHAVIOR MANAGEMENT APPROACH TO ANIMAL WELFARE

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Behavioral health, as a concept, is now well recognized as an important consideration in the welfare status of any captive animal. A systematic, planned approach to each aspect of Behavior Management is critical to ensure that our animals' behavioral needs are being met. Yet, many animal-care professionals remain unaware of the practical considerations important to creating and maintaining successful enrichment and training plans and addressing existing behavioral problems. This presentation will discuss the three components of behavior management: Enrichment; Training; and Problem Solving.

**Keywords:** Behavior management; enrichment; animal training; problem solving.

# II Conferência Brasileira de Enriquecimento Ambiental



## COMPONENTS OF EFFECTIVE AND EFFICIENT ENRICHMENT PLANNING

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The most successful enrichment plans are holistic, individual, goal-oriented, and assessed. The author has used these concepts, for over 10 years, in a variety of situations around the world and has found them to be an excellent mechanism to ensure effective and efficient enrichment planning.

**Holistic:** To ensure consideration of all "enrichable" aspects of the animals' environment, The Shape of Enrichment recognizes 5 categories of enrichment: Social; Cognitive; Physical Habitat; Sensory; and Food.

**Individual:** Enrichment is for the individual - one animal's enrichment may be another animal's nightmare! Successful enrichment planning considers an individual's personal preferences, history, physical fitness, etc.

**Goal-Oriented:** Effective, efficient enrichment planning begins with identifying a behavioral, biological, or logistical goal. Should the animal be encouraged to express a specific natural behavior? Exhibit a greater variety of behaviors? Exercise more to promote physical fitness?

**Assessed:** Once an enrichment plan is developed and implemented, it is imperative that its effectiveness be assessed. Simply put "Did you meet your enrichment goal?"

**Keywords:** Enrichment planning; enrichment categories; enrichment goals; enrichment assessment.

# II Conferência Brasileira de Enriquecimento Ambiental



## ETHOLOGICAL BEHAVIOUR OF RABBITS (*Oryctolagus cuniculus*) KEPT IN CAGES/ PENS AND PREFERENCE TESTS

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ICLAS recommends that the dimensions of the cages should be at least 3,600cm<sup>2</sup> with a minimum height of 35.56 cm. Although the cages available in Brazil present smaller dimensions (2,604cm<sup>2</sup>), they are higher (44 cm). In medium to long term experiments (> 3 months), it is essential to ascertain if the rabbits are showing ethological behavior as well as to verify if lesions are occurring due to the restriction of movement. The behaviors of six female rabbits housed in cages were individually observed, three times a week, during 2 minutes for six months. Radiographic exams were also performed. 12 other rabbits were housed in pens (group of four rabbits per pen) and observed weekly through the scan method, for a period of three months. The animals housed in cages showed reduced general activity and inability to perform ethological movements (lookout and resting position). These animals also showed stereotypies more often than the rabbits kept in the pen. The radiological exams showed ventral spondylosis in the lumbar-sacral spine and decreased intervertebral disc space -L<sub>7</sub>S<sub>1</sub>. Food and sensorial enrichment also took place. Conclusions: For medium and long term experiments, housing rabbits in cages seems to be inappropriate as it doesn't allow ethological movements; it decreases general activity and increases the frequency of stereotypies. It may also induce significant spinal injuries. In the sensorial preference test, the animals chose mainly kale, alfalfa hay, escarole, apple, pear, banana, chewing stick, mineral stone and pine cone. Hence, in order to avoid unnecessary stress and stereotypies, experiments of medium and long term should consider housing rabbits in groups in pens and performing environmental enrichment.

**Keywords:** Stereotypies; sensorial enrichment; rabbit accommodation; vertebral lesions.



# II Conferência Brasileira de Enriquecimento Ambiental



## APPLICATION OF ENVIRONMENTAL ENRICHMENT TECHNIQUES IN A GROUP OF FLYING FOXES *Pteropus vampyrus* KEPT IN AQUÁRIO DE SÃO PAULO EXHIBIT

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Environmental enrichment is responsible for increasing environment complexity and diversity, for promoting the development of species-typical behaviors and physical and psychological well-being. An environment rich in stimuli increases the chances of the animal to deal with stressful events. The husbandry of flying foxes in captivity (*Pteropus vampyrus*) presents two major challenges: obesity and wings atrophy due to the limitation of space. In this work, we studied seven flying foxes (*Pteropus vampyrus*) individuals from the Aquário de São Paulo. Preliminary observations were made in order to determine the pattern of group activities. From this point, the behaviors were recorded by focal sampling at intervals of thirty seconds, for a total of 40 hours, aiming to establish the behavioral patterns of these individuals. The study was divided into two phases, before and after the introduction of environmental enrichment techniques. In the second phase, the items used were: mirrors, rattles, whole fruits, fruit dispenser, ping-pong balls with holes and stuffed with fruit pasta, vine balls with fruit, hoses, rope, spray with water simulating rain, artificial snakes and natural flowers. The results showed significant differences in the increase of time spent on feeding and on food handling, which may be related to the difficulty of access and opportunity for choosing their food. Also, there was an increase in the rate of locomotion, of flight and enclosure exploring, which helps to reduce the risks of obesity and wings atrophy.

**Keywords:** Environmental enrichment; *Pteropus vampyrus*; flying fox; animal welfare.

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# II Conferência Brasileira de Enriquecimento Ambiental



## EVALUATION OF THE INFLUENCE OF FOOD ENRICHMENT ON THE BEHAVIOR OF *Ateles marginatus* KEPT IN CAPTIVITY

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The feeding process requires physical and mental skills that can hardly be expressed in captivity, since the diet is easily provided, requiring little effort by the animal. Consequently, feeding activities such as eating and foraging are impaired having their time reduced, while the downtime and the occurrence of stereotypies increase. Moreover, the food selection in captivity is limited and the way to enrich this husbandry is by making the access to the diet more difficult and providing meals more often. The objective of this work, developed at Fundação RIOZOO, with five individuals of *Ateles marginatus* was to evaluate the influence of food enrichment in time spent feeding and foraging. The enrichment items were provided along with the diet, not causing any nutritional imbalance. The experiment was divided into two phases of observation, the first without the enrichment, and the second, with enrichment. The methodology used was the focal sampling at each feeding period (morning and afternoon), and the behaviors were recorded every 30 seconds, in one hour sessions, totaling 20 hours of records for each animal. The data were analyzed with the SAS System for Windows and as a result, we used the averages, standard deviations and levels of significance ( $p$ ) of the original data. The averages of the analyzed behaviors differ, with some reduction in category inactivity ( $667 \pm 126$ ,  $554 \pm 71$ ) and increased in feeding activity ( $357 \pm 101$ ,  $442 \pm 95$ ), but there was no statistical significance. The visibility of the animals increased significantly when they interacted with enrichment items, encouraging further exploration of the enclosure. This justifies the use of environmental enrichment as an important tool for improving the quality of life of captive animals.

**Keywords:** Environmental enrichment; *Ateles marginatus*, feeding activity.