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### Oral Communications

#### Stress and Play Fluctuation in Wild *Lemur catta*

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*Key Words:* Ring-tailed lemurs · Anxiety · Indicator · Scratching · Playful activity · Madagascar

Strepsirrhines have been neglected in the study of animal play. Yet, data from a wide array of primate taxa are needed to understand role, functions and social determinants of play. We investigated play behaviour in wild ring-tailed lemurs (*Lemur catta*) at the Berenty Reserve (Madagascar) where two other sympatric lemur species, and potential resource competitors, live (*Propithecus verreauxi* and *Eulemur fulvus*). We followed two groups of ring-tailed lemurs (9 and 16 individuals) from November 2006 to February 2007. We evaluated play fluctuation during possible stressful conditions, such as the presence of neighbour groups of conspecifics (C), and the presence of groups of other lemur species (NC). We considered the absence of any other group (A) as the control condition. We first verified whether the presence of other groups did increase stress levels in the study groups. Stress levels were measured via scratching, which previous studies have shown to be a reliable indicator of anxiety in human and non-human primates. Scratching rates in the study animals were higher in the presence of other groups (C+NC) compared to when other groups were absent (A). Overall play rates were highest when other groups were nearby. In presence of NC groups, play rates decreased as NC groups approached the study groups. Instead, when only C groups were in sight, play rates increased as the distance between the study groups and other conspecifics decreased. Moreover, play was highest during extra-group aggressive encounters (involving C groups) whereas it was suppressed during intra-group fights. Our results suggest that play fluctuates in response to different stressful conditions and may be used as a mechanism to cope with anxiety.

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## Assessing Animal Welfare in a Colony of Barbary Macaque (*Macaca sylvanus*) Housed in a Modern Zoological Park: The Effects of a New Exhibit

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*Key Words:* Animal welfare · New exhibit · Zoo visitors · *Macaca sylvanus*

Post-occupancy evaluation (POE) provides a valuable tool with which to assess how different species behave in their new enclosure and how they use different resources within it. In order to ensure animal welfare, it is important to verify that this enclosure allows animals to express behavioural patterns matching those in the wild. The aim of this study is to analyze the effect of a new naturalistic exhibit on the behaviour of a group of 17 Barbary macaques (*Macaca sylvanus*) housed at Bussolengo Natura Viva – Garda Zoological Park (Italy), focusing on the effect of the visitors on the Barbary macaques behaviours. A continuous focal sampling was used to record the duration of the behaviours shown by the colony over a 3-month period in the new enclosure. Results highlight that macaques performed their typical social behaviours, showing grooming and forming clusters, and performed their individual behaviours such as foraging. No stereotypies were recorded and, moreover, aggression levels were very low during the entire observation period. In addition, they spent more than 30% of the time out of view of visitors. An important finding of this study was that in the new enclosure Barbary macaques did not show the typical behaviour associated to the visitors (*begging*); on the contrary, this behaviour was performed in the old exhibit. In conclusion, this study illustrates that modern naturalistic exhibits can improve the welfare of captive primates, allowing them to perform natural behavioural patterns and choose to act away from the sight of zoo visitors.

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## Individual Distinctiveness in the Song of Indris

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*Key Words:* *Indri indri* · Song · Dimorphism · Vocal Communication · Discriminant analysis · Syntax

In animal communication, selected vocalizations have been shown to signal individual attributes, but little is known about singing primates. Indri's song is among the most complex vocal output, and song traits vary substantially between the sexes. The question remains if variation in signalling also reflects consistent individual characteristics. We report the presence of individual characteristics in the spectral and syntactic structure of indris' song. We digitized 383 songs from four adult males and adult females and transformed each individual contribution into a resynthesized sound file based on the pitch contour to represent the temporal and frequency distribution of individual singing. A statistical discrimination with cross validation performed on the resulting variables allowed us to correctly identify 87.9% of the adult individuals. Then we documented the structure of songs in terms of roar, long notes and sequences of descending phrases. A high percentage of correct classification was obtained for females considering both long notes and descending phrases notes (76.1, and 84.7%). Discriminant analysis

applied to male notes showed that 66.4% of individuals were correctly classified considering long notes and 64.9% considering descending phrases notes. Song structure reflects intrinsic behavioural characteristics such as identity traits.

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## The Snub-Nosed Monkeys of China

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*Key Words:* *Rhinopithecus* · Primates · Conservation

The genus *Rhinopithecus* comprises three species endemic to China: *R. roxellana*, *R. brelichi*, and *R. bieti*. They represent a unique, though understudied, adaptive array. Their distributions span from relatively low to high altitudes (1,000–4,000 m), from tropical to conifer forests. All species are threatened by poaching and habitat loss (because of wood extraction, building projects and illegal mining). Estimates of 1,500 to 10,000 were reported by IUCN and urgent conservation actions are required to prevent the extinction of these species. Basic descriptions of the ecology and behaviour of the three Chinese snub-nosed monkey species have been provided in recent years, but more field studies are needed to reveal how their peculiar morphology plays a role in communication.

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## Unusual Plant Consumption by Captive Chimpanzees (*Pan troglodytes*), Gorillas (*Gorilla gorilla*) and Orangutans (*Pongo sp.*): Learning Mechanisms Involved

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*Key Words:* Neophobia · Social learning · Zoopharmacognosy · Great apes

More and more studies suggest the existence of self-medication behaviours in great apes. This study aimed to understand the factors influencing the discovery of potentially curative items and to evaluate the possibilities for social transmission of such knowledge. We presented four different categories of plants ( $n_{\text{species}} = 7$ ) to captive groups of chimpanzees ( $n_{\text{individual/group}} = 14-9$ ), gorillas ( $n_{\text{individual/group}} = 7-5-3$ ) and orangutans ( $n_{\text{individual/group}} = 7-10-4$ ): (1) more preferred-familiar item, (2) less preferred-familiar, (3) more preferred-unfamiliar and, (4) less preferred-unfamiliar. We recorded inspecting behaviours, food consumptions, inter-individual observations and food transfers with continuous sampling. Chimpanzees sniffed plants more frequently and ingested them less than the other apes. Close observations and food sharing were very rare in gorillas in comparison to orangutans and chimpanzees. We hypothesize that individual learning, allowed by low neophobia levels, may be linked to adaptation to the unpredictable habitats (orangutans) and to physiological features (the gorilla digestive system able to detoxify plants). Furthermore, social learning may be favoured by a social system that allows moderate levels of tolerance and interactions among the individuals (chimpanzees and orangutans).