BIAZA Research Committee Conference

July 2021

Book of Abstracts

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remained the same. The caretaking routine had changed according to roughly half of the respondents on this question (11/24) and remained the same for the other half (13/24). Animal trainings had diminished for most respondents (n=15), had increased for a few (n=2) or had remained the same (n=6). 43% of the respondents (n=10) said there were no changes in the amount of enrichment available to the animals, 48% (n=11) said there was less enrichment because they had less time, the enriching visitors were absent or less material was available. Only one person said there was more enrichment due to the extra time gained from lower maintenance of visitor spaces. The tasks listed by the respondents at which less time was allotted due to impact of Covid-measures were cleaning, training, observation, enrichment, maintenance, and animal treatments. Of 28 respondents 54% felt more stressed at work, 46% was not more stressed than usual. The observed changes in animal behaviour in the lockdown-period were more play (3/25), less play (2/25), more sexual behaviour (3/19), more sleep (2/16), more time spent inside (1/23). We conclude that the factor with the highest risk for decreased welfare was the decreased time that could be allotted to the animal care, training and enrichment due to the restriction of personnel number. No conclusive results regarding the actual welfare could be drawn from the few reported changes in behaviour.

Morwenna E Hope[1,2], Rebecca Mogey[1], Susan L Walker[1] and Katie L Edwards[1]
[1] North of England Zoological Society, Chester Zoo, Chester, Cheshire, United Kingdom. CH2 1LH. m.hope@chesterzoo.org (presenting author); k.edwards@chesterzoo.org (corresponding author)
[2] College of Life and Environmental Sciences, University of Exeter, Penryn Campus, Penryn, Cornwall, United Kingdom. TR10 9FE.

Validating faecal thyroid hormones in the black rhinoceros (*Diceros bicornis*)

Management of the black rhinoceros (*Diceros bicornis*) is important both *in-* and *ex-situ* due to the species' critically endangered status. It is fundamental that individuals acquire adequate energy in their diet to fuel growth, reproduction and overall survival. Analysis of thyroid hormones can be used to assess an animal's energetic condition due to their crucial roles in energy homeostasis and distribution. We used enzyme-immunoassays to non-invasively monitor the thyroid hormones triiodothyronine (T3) and thyroxine (T4) using faecal samples (n=490) from 58 captive black rhinoceroses (22 male and 36 female) across British and European zoos to infer their energetic condition and investigate potential differences over time and between physiological states. Using these tools, we are investigating whether levels of T3 and/or T4 significantly differ between i) seasons, ii) sex, iii) age category, iv) with body condition scores, and v) throughout pregnancy. This study will contribute to the current literature regarding the endocrinology of the black rhinoceros and in the future could aid *in-situ* conservation by providing a basis for future monitoring the health and ecophysiology of wild populations in relation to their different habitats.

Jonas Torfs[1,2]
[1] Behavioural Ecology and Ecophysiology Research Group, Department of Biology, University of Antwerp, Antwerp, BELGIUM jonas.torfs@uantwerpen.be
[2] Centre for Research and Conservation, Royal Zoological Society of Antwerp, Antwerp, BELGIUM

Investigating the effects of sex and rearing-history on social network position in zoo-housed bonobos

Social network analysis can be a valuable tool for the management of zoo-housed animals and captive breeding programs, since an individual's social network position is typically associated with its reproductive success, longevity, and overall welfare. This is especially true for primates, due to their rich and complex social lives. While many studies have investigated individual network position in primates, most studies typically sample only one group. Therefore, the question remains as to whether such results can be generalized across different groups of the same species. Moreover, many social network studies tend to focus on model species like macaques and chimpanzees, while other species, like bonobos, remain understudied. To fill these gaps in our knowledge, we constructed social grooming networks for 14 different groups of zoo-housed bonobos, and investigated the effects of sex and rearing-history (mother reared versus atypically reared, e.g. being wild-caught or hand-reared) on individual variation in social network position. Results showed that males and females did not differ in the amount of grooming given or grooming received, nor in network centrality. However, males were more restricted in their grooming relationships than females. In addition, an effect of rearing-history was found on the centrality of an individual, with mother-reared individuals being more central, and therefore more popular, in the grooming network than atypically-reared individuals. Rearing-history also affected the amount of grooming received, but in a sex-specific matter: mother-reared males received more grooming than atypically-reared males, while this effect was absent in female bonobos. While past studies on grooming behaviour in bonobos focused strongly on sex-differences, our results show that males and females do not differ in grooming rates, and both sexes can occupy