

# THE INFLUENCE OF ENCLOSURE CONDITIONS AND SOCIAL INTERACTIONS ON FAECAL GLUCOCORTICOID LEVELS IN AFRICAN LIONS

*(Panthera leo bleyenberghi)*

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## INTRODUCTION

Faecal cortisol metabolites (FCM) analysis through faeces is advantageous as they can be easily collected, the procedure is non-invasive and provide a daily average of the hypothalamus-pituitary-adrenal axis activation

## OBJECTIVES

The aim of the present study, using FCM determination, was to evaluate if:

1. **Social relations and enclosure conditions can modify the pattern of FCM**
2. **Differences between animals can be assessed depending on hierarchy ranks**
3. **Higher FCM can be observed in worse enclosing conditions**

## MATERIAL AND METHODS

**Number of lions (n=5):** 4 adult lions [Male 1 (M1), Female 1(F1), Female 2 (F2) and Female 3 (F3)] and 1 sub-adult [Male 2 (M2)]

Females were on contraceptives

**Date and location:** 16/02/2019 - 21/03/2019, Barcelona Zoo (Spain)

The animals were divided into two prides

Faeces were collected every morning using coloured waxes as individual markers

**Table 1.** Weekly management between outdoor and indoor facilities of the two prides of African lions in Barcelona Zoo. Underlined animals are the dominant lions according to zookeepers

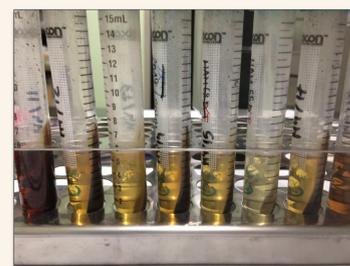
	PERIOD 1 (P1)				PERIOD 2 (P2)		
	Mon	Tue	Wed	Thur	Fri	Sat	Sun
OUTDOOR	<b>M2+ <u>F1</u>+ F2+ F3</b> <b>(GROUP 1)</b>				<b><u>M1</u>+ F2+ F3</b> <b>(GROUP 2)</b>		
INDOOR	<b>M1</b>				<b>M2, F1</b>		



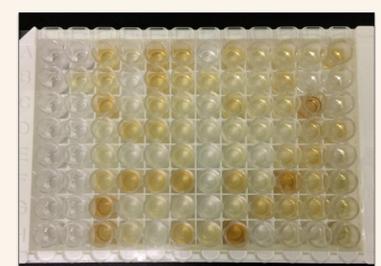
Shredded waxes ready to feed the lions



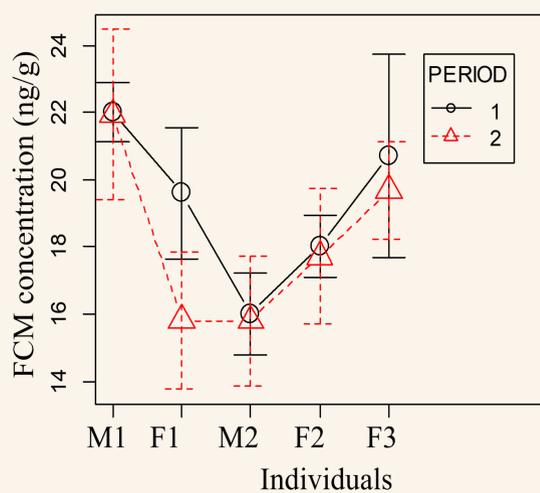
Identification of samples by colour detection



Methanol extraction



EIA (Neogen®) for FCM determination



**Figure 1:** FCM concentrations (ng/g) of each lion during the first (P1) and the second period (P2)

## RESULTS

- Significant differences in FCM levels in relation to **AGE** ( $p = 0.009$ )
- Significant differences in FCM levels in relation to **INDIVIDUALS** ( $p = 0.01676$ )
  - Differences between M1-F1 ( $p = 0.05$ ), M1-M2 ( $p = 0.001$ ), M1-F2 ( $p = 0.04$ ) and M2-F3 ( $p = 0.23$ ).
- SEX** of the individuals did not affect FCM levels ( $p = 0.74$ )
- No significant differences between **ENCLOSURE CONDITIONS** ( $p = 0.60$ )

## CONCLUSIONS

**Social interactions can induce a modification detectable in FCM profile**  
**Most of the differences between animals have been observed according to their hierarchical rank**  
**No significant differences were detected due to enclosure conditions**