

A Non-Invasive Method for Assessing the Adrenocortical Function in the Roan Antelope (*Hippotragus equinus*)

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Abstract : The roan antelope (*Hippotragus equinus*) is the second largest antelope species in Africa. These past decades, populations of roan antelope are declining drastically throughout Africa. This situation resulted in the development of intensive breeding programmes for this species in Southern African, where they are popular game ranching herbivores in with increasing numbers in captivity. Nowadays, avoidance of stress is important when managing wildlife to ensure animal welfare. In this regard, a non-invasive approach to monitor the adrenocortical function as a measure of stress would be preferable, since animals are not disturbed during sample collection. However, to date, a non-invasive method has not been established for the roan antelope. In this study, we validated a non-invasive technique to monitor the adrenocortical function in this species. Herein, we performed an adrenocorticotrophic hormone (ACTH) stimulation test at Lapalala reserve Wilderness, South Africa, using adult captive roan antelopes to determine the stress-related physiological responses. Two individually housed roan antelope (a male and a female) received an intramuscular injection with Synacthen depot (Norvatis) loaded into a 3ml syringe (Pneu-Dart) at an estimated dose of 1 IU/kg. A total number of 86 faecal samples (male: 46, female: 40) were collected 5 days before and 3 days post-injection. All samples were then lyophilised, pulverized and extracted with 80% ethanol (0,1g/3ml) and the resulting faecal extracts were analysed for immunoreactive faecal glucocorticoid metabolite (fGCM) concentrations using five enzyme immunoassays (EIAs); (i) 11-oxoetiocholanolone I (detecting 11,17 dioxoandrostanes), (ii) 11-oxoetiocholanolone II (detecting fGCM with a 5 α -pregnane-3 α -ol-11one structure), (iii) a 5 α -pregnane-3 β -11 β ,21-triol-20-one (measuring 3 β ,11 β -diol CM), (iv) a cortisol and (v) a corticosterone. In both animals, all EIAs detected an increase in fGCM concentration 100% post-ACTH administration. However, the 11-oxoetiocholanolone I EIA performed best, with a 20-fold increase in the male (baseline: 0.384 μ g/g, DW; peak: 8,585 μ g/g DW) and a 17-fold in the female (baseline: 0.323 μ g/g DW, peak: 7,276 μ g/g DW), measured 17 hours and 12 hours post-administration respectively. These results are important as the ability to assess adrenocortical function non-invasively in roan can now be used as an essential prerequisite to evaluate the effects of stressful circumstances; such as variation of environmental conditions or reproduction in other to improve management strategies for the conservation of this iconic antelope species.

Keywords : adrenocorticotrophic hormone challenge, adrenocortical function, captive breeding, non-invasive method, roan antelope

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