

Signs for eustress but not distress in black rhinos (*Diceros bicornis*) moved into new housing facilities at Magdeburg Zoo, Germany

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Translocations are invasive and potentially stress-inducing events. Stress may be acute (eustress) or chronic (distress), leading to opposite effects: Acute stress is a punctual response to a short-term stressor, which rapidly wanes and is followed by homeostasis. Chronic stress, however, is a prolonged state with greater potential to negatively affect growth, reproduction and survivorship.

Several studies have used faecal corticoid metabolites (FCM) to assess the stress responses of black rhinos (*Diceros bicornis*) in conjunction with soft-release translocations (capture in the wild, immobilisation, transportation and boma / enclosure management at destination). These procedures lead to ongoing acclimatisation responses in terms of constantly decreasing FCM levels over several weeks. There is, however, little information about the stress level in conjunction with less invasive translocation procedures, e.g. when shifting black rhinos within a zoo between housing facilities.

We measured the FCM concentrations of four black rhinos during a transfer into new housing facilities at the Zoological Garden in Magdeburg (Germany) and one year afterwards using an enzyme immunoassay. The aim was to evaluate the degree of stress responses to the transfer and compare it with FCM profiles from much more invasive *in situ* studies reported in the literature. We give a detailed description of the transfer procedure and housing facilities to highlight the expected lower degree of invasiveness when comparing this study with information from the literature.

As expected, FCM profiles of individual rhinos clearly differed from those described in the literature and showed a moderate and punctual response in conjunction with the transfer but no signs of a period of acclimatisation over several days or even longer. Increased FCM levels of one female one year after the transfer were probably not related to distress caused by the new housing facilities but could be linked to the reproductive status (5 - 6 months before parturition).

Our contribution may serve as a case study for a successful transfer procedure of black rhinos into new housing facilities within zoological gardens, since no signs for distress were detected. Moreover, we assume that moderate eustress may serve as a positive stimulus, which can even increase the reproductive performance of black rhinos in captivity.