

SUPPLEMENT

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days in length. All efforts should be undertaken to successfully breed female white rhinos before age 10 y. Otherwise ovarian activity is prone to the development of persistent luteal activity, paving the way to ovarian and uterine pathologies. In some young cows ovarian activity diminish to flatliner status. The distribution of births in the EEP indicates reproductive seasonality in some cows, which correlates with missing luteal activity during winter months. The EEP recommendation is to keep white rhinos in groups of 1 male and 2-4 females. However this does not guarantee successful breeding. Therefore, in order to stimulate breeding in non-reproducing white rhinos, changing group composition is recommended. Suggestions include transfer of males or females between groups, or to separate, yet to unify males with his herd of females after a few months of separation. Future endocrine monitoring will study effects of varying group size on reproductive parameters, or the influence of a white rhino cow on the reproductive endocrinology of its calf. The ultimate goal is to improve breeding success in captive white rhinoceroses.

PR3

Using hormone analysis to investigate reproductive success in the female eastern black rhinoceros (*Diceros bicornis michaeli*)

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With fewer than 750 eastern black rhinoceros left in the wild, ex situ populations play a vital role in the conservation of this species. However, for captive populations to fulfill their role, they must be self-sustaining. Over the last decade, the European captive population has been relatively stable, but low rates of reproduction are limiting growth. On average, only 11% of mature females reproduce each year and 41% of reproductive age individuals in the current population are yet to successfully produce offspring.

In an attempt to improve population performance, this study was initiated to investigate why

individuals may be failing to reproduce. Reproductive monitoring was carried out on 89% of the population (n=24 males, 39 females), using progesterone (CL425, UC Davis), oestradiol (R4972, UC Davis), testosterone (R156/7, UC Davis) and corticosterone (CJM006, UC Davis) enzyme immunoassays to investigate differences in reproductive success.

Reproductive cycles were observed in 94% of mature females, and normal cycles ranged from 20-40 days in length. However, irregular cycles were also common, with a high incidence of long (41-179 days) and short (10-19 days) cycles, and periods of acyclicity also seen. Periods of regular and irregular cyclicity were observed in both parous and nulliparous females; and individuals often exhibited both over a 12-month sampling period.

Average faecal glucocorticoid concentration (fGC) did not differ between parous and nulliparous females, so differences in fGC between regular and irregular periods of cyclicity were investigated within individuals. Faecal glucocorticoid metabolites were higher during irregular cycles and during long cycles, compared to both short and normal length cycles and to anoestrus periods.

A better understanding of reproductive function and factors that could affect reproductive success could improve population performance by increasing both reproductive output and the proportion of females that contribute to future breeding success.

PR4

Relationship between management, adrenal activity and reproduction in a captive group of female Asian elephants (*Elephas maximus*)

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Asian elephants in captivity can be prone to reproductive problems including acyclicity and asymmetric reproductive ageing. To maintain healthy and sustainable herds in captivity, a better understanding of potential influences on reproductive cyclicity are warranted. Routine reproductive monitoring carried out on a herd of five reproductive age females revealed that oestrus cycles were