This proceeding paper contains the abstract and some figures of a paper currently in press in Animal Reproduction Science. For more detailed information please refer to this paper or contact Franz Schwarzenberger at: Institut für Biochemie & Ludwig Boltzmann-Institut für veterinämedizinische Endokrinologie, Veterinämedizinische Universität, A-1210 Vienna, Austria; Tel: +43-1-25077 4104; Fax: +43-1-25077 4190;
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Faecal progesterone metabolite analysis for non-invasive monitoring of reproductive function in the white rhinoceros (*Ceratotherium simum*)

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The two subspecies of white rhinoceros, southern (*Ceratotherium simum simum*) and northern (*C. s. cottoni*) breed poorly in captivity, and estimates of oestrous cycle length vary considerably (range, 25-90 days). To characterize reproductive patterns, faecal samples were collected 2-3 times/week for up to 56 months from non-pregnant animals (n = 21) of both subspecies. Immunoreactive pregnanes containing a 20-oxo-group (20-oxo-P) were analyzed in a group-specific enzyme immunoassay using an antibody against 5α-pregnane-3β-ol-20-one 3HS:BSA. Reproductive patterns were highly variable among and within individual animals. However, rhinoceroses could be classified into four major categories on the basis of oestrous cycle length and luteal phase 20-oxo-P concentrations: 1) regular oestrous cycles of 10 weeks duration and >800 ng/g (n = 2 animals); 2) oestrous cycles between 4-10 weeks and 250-750 ng/g (n = 6); 3) no apparent cycle regularity, but luteal activity indicated by 20-oxo-P concentrations of 100-200 ng/g (n = 6); 4) no apparent luteal activity as indicated by 20-oxo-P of <100 ng/g (n = 7). In two attempts to induce ovarian activity, chlormadinone acetate was fed daily to one animal for 35 and 45 days, respectively. Each treatment was followed by a subsequent hCG injection which resulted in luteal phases of 17 and 18 days, respectively, beginning about 10 days after hCG. Concentration of faecal 20-oxo-P in one pregnant animal during the 4th and 5th month of gestation were markedly higher than those observed during the luteal phase of the cycle. In conclusion, two thirds of white rhinoceroses in this study had erratic or missing luteal activity, whereas variable cycles of 4-10 weeks in length were evident in six females, and regular oestrous cycles of 10 weeks in length were found in two animals.

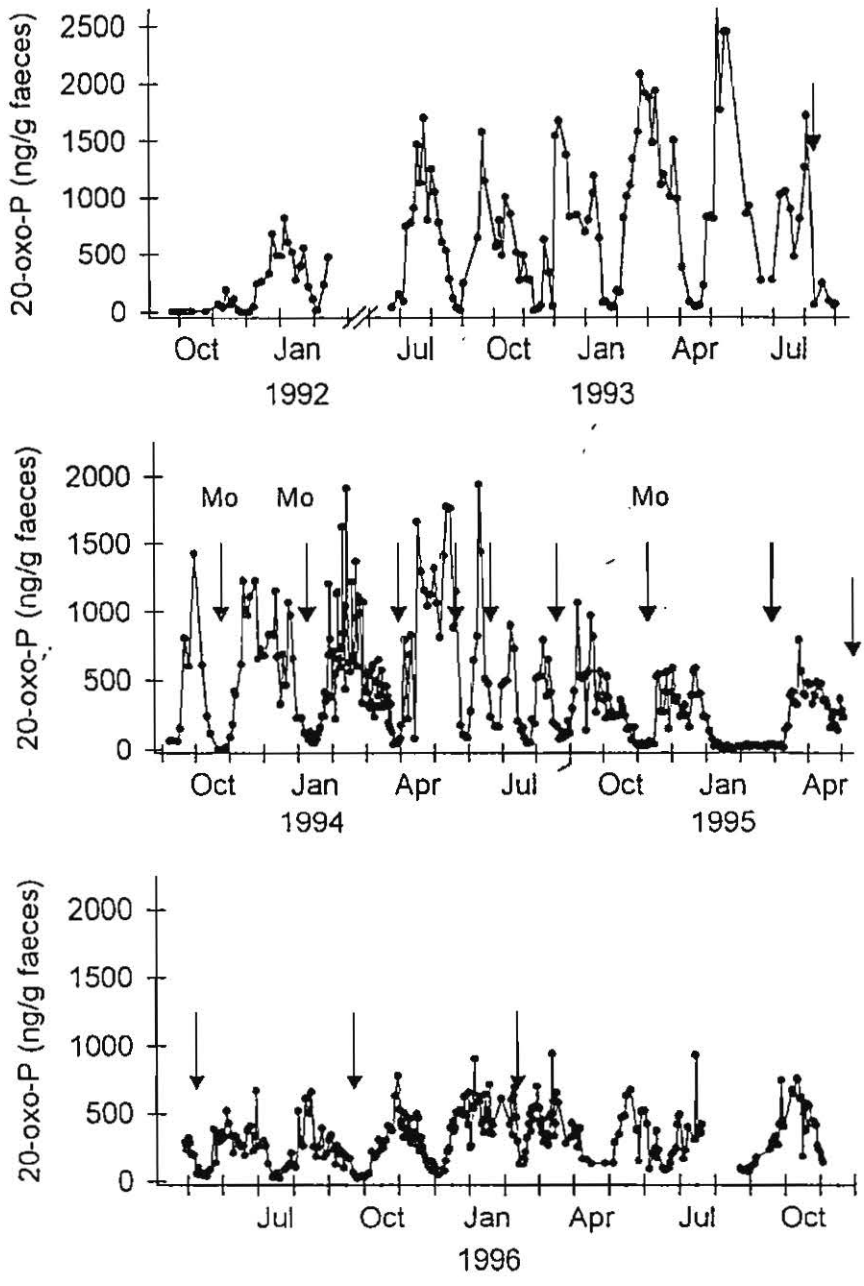

Fig. 1. Concentrations of faecal 20-oxo-P in a white rhinoceros (Kathy) during 1991-1996. According to the regularity of oestrous cycles and luteal phase 20-oxo-P concentrations, oestrous cycles in this female were generally classified as category 1 until May 1994, and as category 2 after June 1994. Arrows indicate behavioural oestrous, Mo indicates mounting by the bull.

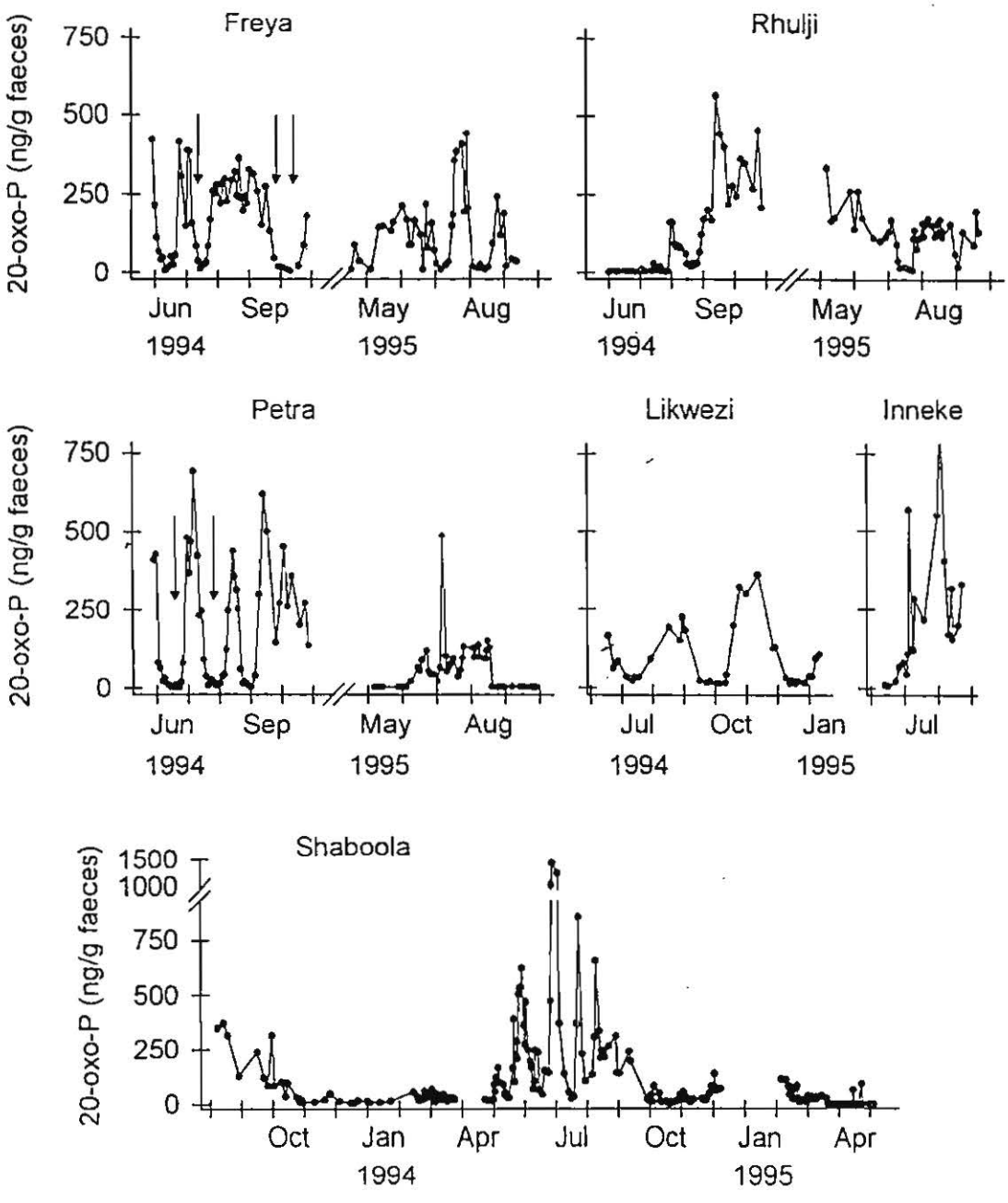

Fig. 2. Concentrations of faecal 20-oxo-P in six white rhinoceroses which, according to the regularity of oestrous cycles and luteal phase 20-oxo-P concentrations, were classified as category 2. Arrows indicate mating.

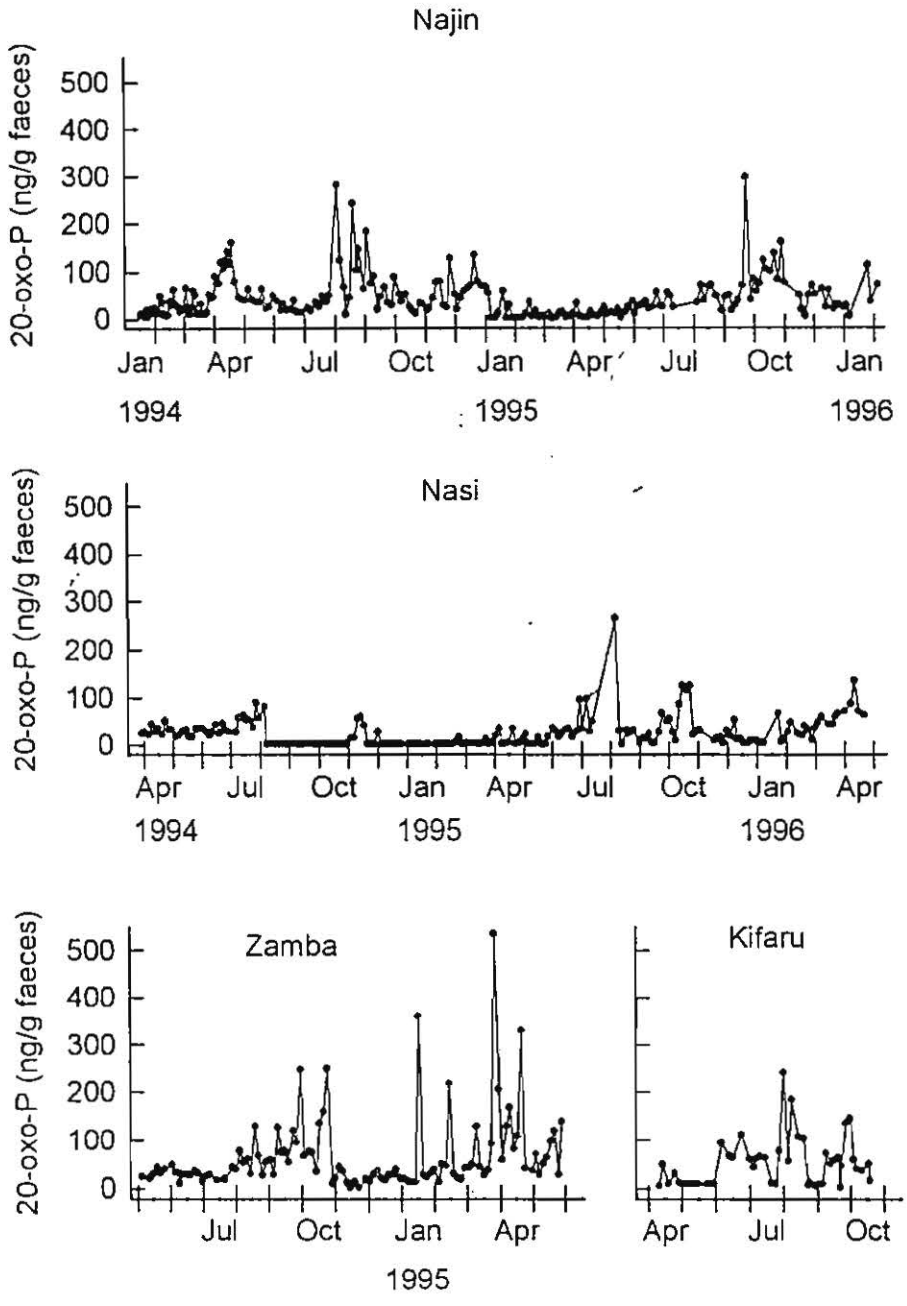

Fig. 3. Concentrations of faecal 20-oxo-P in four white rhinoceroses which, according to missing oestrous cycles (no apparent regularity), but some luteal activity indicated by 20-oxo-P values of 100-200 ng/g of faeces, were classified as category 3.

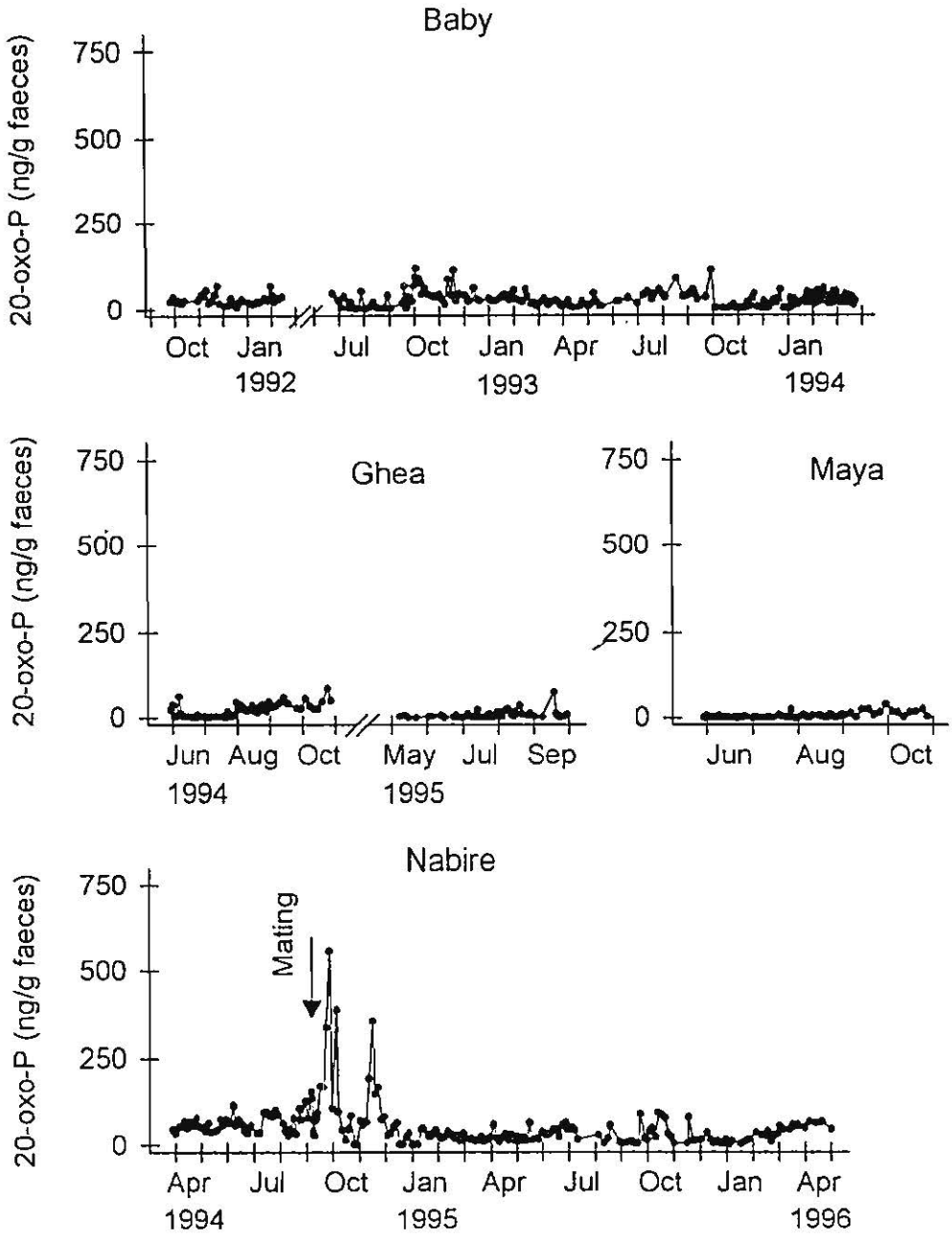

Fig. 4. Concentrations of faecal 20-oxo-P in four white rhinoceroses which, according to missing oestrous cycles and no appaerent luteal activity were classified as category 4. An exception are the two luteal phases in the female 'Nabire' in 1994, which were classified as category 2.

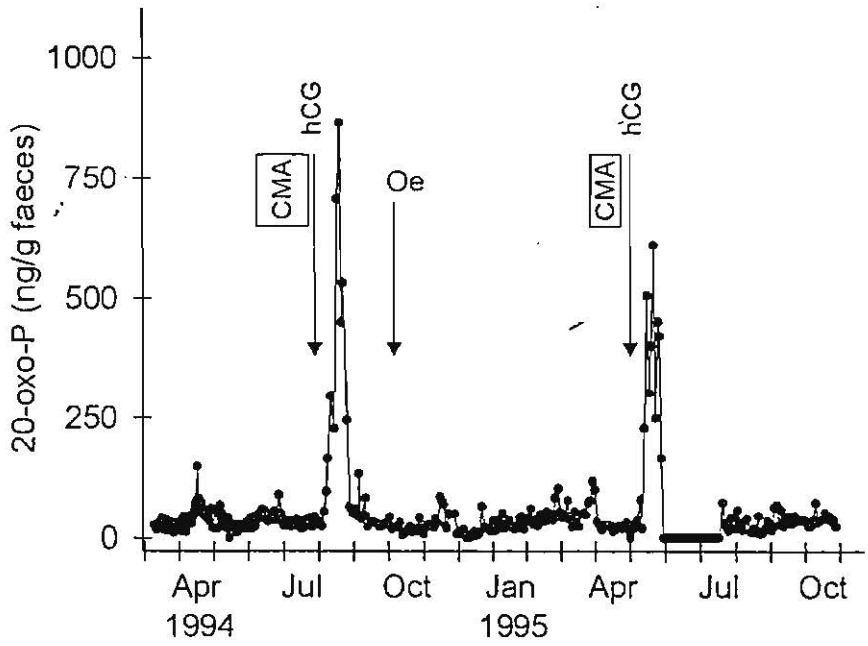

Fig. 5. Concentrations of 20-oxo-P in faecal samples of a white rhinoceros (Baby) before, during and after the treatment with the synthetic progestin chlormadinone acetate (CMA), and hCG. Oe indicates oestrus behaviour.