

PROBLEMS ASSOCIATED WITH THE LOW REPRODUCTIVE RATE IN CAPTIVE WHITE RHINOCEROSSES (*CERATOTHERIUM SIMUM*) - AN UPDATE

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Extended Abstract

At the recent Wildlife Disease Symposium in Vienna suggestions were made to overcome the reproductive problems occurring in the captive white rhinoceros population (SCHWARZENBERGER et al., 1999). In accordance with these suggestions a multi-disciplinary, multi-institutional research-project was made possible by grants from the IRF and SOS Rhino (SCHWARZENBERGER et al., 2001). The major findings from this project are summarized in this report.

Our combined approach to overcome reproductive problems in captive white rhinoceroses include:

- 1) endocrine monitoring
- 2) transfer of animals to enhance natural breeding
- 3) clinical examinations of reproductive soundness in female white rhinoceroses
- 4) development of treatment protocols for uterine and ovarian cystic conditions
- 5) clinical examinations of reproductive soundness in male white rhinoceroses
- 6) electro-ejaculation and development of protocols for semen-cryoconservation
- 7) attempts at manual semen collection in un-sedated male white rhinoceroses
- 8) development of artificial insemination (AI) (HERMES et al., 2000; HILDEBRANDT, 2002).

Work is still in progress, but results make the white rhino EEP one of the most progressive due to direct inclusion of research results into management decisions. The generation of presently available data was only possible by combining the techniques of endocrine monitoring with ultrasonographic examinations and the development of a reliable anesthesia protocol (Walzer et al., 2001). During the past 3 years over 100 clinical examinations were performed. The number of fecal samples analyzed for reproductive hormones summarizes to over 5000 samples.

Approximately 60 % of female captive white rhinoceroses are acyclic (SCHWARZENBERGER et al., 1998). The reasons are 1) females with no luteal activity (true flatliners) and 2) females with persistent luteal activity. Females from the last group are nulliparous, and usually over 12 years of age. The source of the luteal activity are ovarian and uterine cysts of up to 10 cm in diameter. The permanent estrogenic production of these large cysts cause severe uterine pathologies subsequently resulting in infertility. In contrast to nulliparous females, cysts are usually not present in primi- or multiparous females, even when the birth of the last offspring was 20 y ago, i.e. female 0230 had one offspring at the age of 10 y and her 2nd offspring at the age of 30 y. 0230 was examined by rectal ultrasonography at the age of 28 y and on this occasion her healthy reproductive tract was confirmed. Mating followed a change in the social structure in this case, as a new male was brought into this group of animals, when Freya was about 26 y old.

Endocrine monitoring and rectal ultrasonography identified uterine and ovarian pathologies. Cysts in northern and southern female rhinoceroses were treated with long-acting deslorelin (Peptech, Sydney, Australia) implants. This treatment appears quite effective and 2 of the treated females with former uterine cysts are now candidates for AI. A reliable AI technique suitable to overcome difficult anatomical structures of the female genital tract is available, however, attempts have not resulted in pregnancy to date (HERMES et al., 2003).

Two protocols for ovulation induction in cases of missing luteal activity are currently under investigation. One protocol uses a synthetic progestagen (Chlormadinone-Acetate) followed by an hcG injection, the second protocol uses short-acting GnRH injections with ultrasonographic control of follicle maturation in 1-2 days intervals (HERMES et al., 2003).

Male infertility is a severe additional problem and cause for the low reproductive rate in captive white rhinoceroses. Semen collection by electro-ejaculation proved to be a reliable technique and about 50 procedures were performed to date (HERMES et al., 2000). Ejaculates collected with this method were used for cryopreservation and results suggest that post thaw quality is sufficient for artificial insemination. Further, our results imply that more than 2 male white rhinoceroses in the same institution can suppress each other's fertility. A change in the social structures by moving animals between zoos is especially effective in these cases, and has proved successful in Safari Ramat Gan, Israel (SEROR et al., 2002).

Semen collection by conditioning male white rhinoceroses for manual semen collection and use of pharmacological methods for enhancing penile erection did not result in full ejaculates, but small amounts of semen gathered by this method were cryopreserved and used in an AI attempt (SILINSKI et al., 2002).

Acknowledgments

Financial support for this work was granted by IRF (International Rhino Foundation), SOS-Rhino and Burger's Zoo Arnhem, Zoo Givskud. We are grateful to all involved EEP and SSP institutions for giving access to their animals

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