

IMPROVEMENT OF MALE FERTILITY BY LONG-TERM BETA-CAROTENE SUPPLEMENTATION IN WHITE RHINOCEROSSES (*CERATOTHERIUM SIMUM*)

Robert Hermes, Dr,^{1*} Frank Goeritz, Dr,¹ Christian Walzer, Dr,² Steffen Blottner, Dr,¹ Sandra Siliniski, med vet,² Franz Schwarzenberger, aProf, Dr,³ Wolfgang Joechle, Prof, Dr,⁴ Michael Cordes, Dr,⁵ and Thomas B. Hildebrandt, DVM,¹

¹Institute for Zoo and Wildlife Research, Alfred-Kowalke-Str. 17, 10315 Berlin, Germany; ²Salzburg Zoo Hellbrunn, A-5081 Salzburg, Austria; ³University of Veterinary Medicine, Institute for Biochemistry, Vetrinaerplatz 1, 1210 Vienna, Austria; ⁴Wolfgang Joechle Associates Inc., 10 Old Boontown Road, Denville, NJ 07834 USA; ⁵Salvana Tiernahrung GmbH, Rosenstrasse 9, 25365 Kl.O.-Sparrieshoop, Germany

Reprinted with permission from American Association of Zoo Veterinarians Joint Conference. October 4-10, 2003.

Abstract

Substantial knowledge on the reproductive physiology of the female white rhinoceros (*Ceratotherium simum*) has been gathered over the past years. However, little emphasis has been put on the evaluation of male fertility as a possible contributing factor to the demographic crisis of the captive population considering that 81% of male captive white rhinoceros have not sired offspring. Objective of this study was the reproductive assessment of male white rhinoceros to determine their semen characteristics. Ultrasound and electroejaculation were conducted in 20 anesthetized white rhinoceros, which had not sired offspring. Electroejaculation represented a semen collection method, which allowed a repeatable semen assessment applicable to the different management systems and training standards. Semen quality was evaluated on the basis of one to four semen samples collected during this 4-yr study. Fifty percent of the males examined showed suboptimal and inconsistent semen characteristics. Social stress and vitamin A insufficiency were discussed as potential causes for the reduced semen quality. Beta-carotene supplementation used in the stallion and boar has shown to improve semen characteristics. In a preliminary study, one single-housed individual was supplemented with 1,200 mg/day beta-carotene over period of 14 mo. Beta-carotene improved sperm motility from presupplementary 50-80% after supplementation. From the large proportion of intermittent and infertile males assessed in this study, increased efforts should be made to improve breeding fitness of nonrepresented male white rhinoceros. Dietary beta-carotene supplementation may represent an easy-to-apply measure to improve spermatogenesis and fertility in the white rhinoceros.