From EEP to high-end research and back: the example of the southern white rhino

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In the early 1990s, the population of southern white rhino (*Ceratotherium simum simum*) in European zoos suffered from a very low reproductive rate. Only very few institutions kept more than one pair, and only in larger groups reproduction seemed to occur albeit only one or two females maximally. Most calves were born to imported animals from the 1970s and early 80s, who were slowly moving towards non– reproductive age classes.
Following the establishment of an EEP (European Endangered species Programme), coordinated research and management activities were initiated. In a series of ethological studies in European zoos, questions of female social relationships (kin, age, rank related) and stress physiology were addressed. It was found that females, particularly when kept in kin groups, dominated bulls most of the time and that standard feeding procedures (clumped hay feeding) caused additional stress. Also, in a series of field studies, possible influences of territorial quality and male reproductive hormone status, as well as feeding ecology and physiology, on female mate choice were demonstrated, but were not related to obvious territorial characteristics. More however, as tested experimentally in zoo animals again to certain olfactory components in urine and faecal markings.
In a next step, reproductive monitoring of female, later also male condition in zoo animals demonstrated a rather high occurrence of asymmetric ageing phenomena (pathological changes in female reproductive tracts due to non–reproductive cycling) and different hormonal profiles of female cyclicity with several patterns, only one of them, the one – month regular cycle leading to successful impregnation normally. Following these findings, the EEP adopted a series of management recommendations, the most important ones being to move animals out of pair into group holding conditions, and a policy of monitor – move – manipulate (MMM) which means the reproductive cyclicity in females and the absence of pathological changes, should be determined in all individuals of reproductive age that do not reproduce currently. Should there be no adverse reproductive conditions, then an exchange of males between institutions was to be organized (which in most cases already sufficed to get cows pregnant soon after). Should this also fail, then manipulations of assisted reproduction, from hormonal kick starts by FSH/LH injections to artificial insemination, should be considered.

The practices successfully increased the number of calves born and reared per year, and helped to stabilize and even increase the populations within the EEP