

THE SNOW LEOPARD (*PANTHERA UNCIA*): MONITORING REPRODUCTIVE ACTIVITY IN A CONTROLLED ENVIRONMENT

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KEY WORDS: wild felines, reproduction, sexual hormones

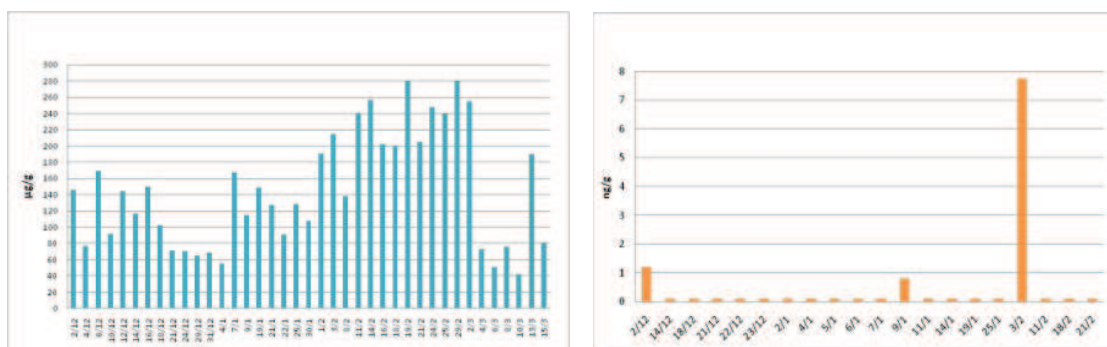
ABSTRACT - Conservation programs for endangered wild felines in controlled environments are subordinated to the objective of ensuring proper management of these animals. The aim of this study is to monitor the reproductive activity of snow leopards (*Panthera Uncia*) in a controlled environment -Natura Viva Park in Bussolengo (VR)- using a non-invasive method for collecting samples. The snow leopards, object of this study, haven't produced offspring despite the manifestations of oestrous in the female. The reproductive patterns were assessed observing the animals' behaviour and using radioimmunoassay for the determination of faecal steroid concentrations (progesterone and testosterone). The female showed a cyclic alternation of follicular and luteal phases: the seasonal pattern therefore appears to be normal. The progressive rise in progesterone levels following ovulation could have been either induced by coupling (not observed) or could have been spontaneous since the subjects live together. In the male, the testosterone concentrations remained low during the week of maximum female progesterone concentration. Therefore it can be assumed that the reproductive failure observed is linked to poor and erratic production of testosterone, promoter of spermatogenesis and sperm maturation.

INTRODUCTION - Of the 37 existing feline species, all except the domestic cat are threatened with extinction¹. Most felines housed in controlled environments reproduce poorly because of behavioural incompatibility, captivity stress, inappropriate husbandry and progressive loss of genetic variability¹. It is therefore essential to recreate a habitat compatible with the animal's needs and to guarantee conservation through efficient breeding programs. To monitor the reproductive activity of wild felines using a non-invasive method of sample collection is a approach preferred in non-tractable and stress-susceptible species as it is more practical compared to other procedures which require the capture, the containment and the sedation of animals². The objective of this study is to detect the reproductive activity and the causes of infertility in a couple of snow leopards.

MATERIALS AND METHODS - Two adult felines, a male and a female housed in the park "Natura viva" in Bussolengo (VR), NE Italy, haven't produced offspring despite the evident estral manifestations of the female. Faecal progesterone and testosterone concentrations were measured every couple of days and correlated with behavioural observations. The trend of steroid metabolites was determined using techniques validated on wild animals³.

RESULTS - The concentrations of progesterone increased progressively reaching the maximum values in the spring time (280 µg/g). The trend then decreased rapidly during autumn reaching the minimum values in winter (50 µg/g) (Graph 1). The concentrations of faecal testosterone, low at the start of the winter, increased in January and in the first half of February (8 ng/g) but then fell to minimum values again (Graph 1). Most of the

values were close to 0 ng/g especially during the breeding season, when the female exhibited sexual behaviour (rolling, lordosis, growls, marking, urinating and calling).



Graph 1 - Trend of Progesterone ($\mu\text{g/g}$) and Testosterone (ng/g) in faecal samples in the snow leopard.

DISCUSSION - Progesterone trends are more accurate than oestrogen trends in detecting malfunctions and pathologies connected with infertile mating⁴. The results show that the female exhibits both the follicular and luteal phases. The hormone trend is normal since the concentration of progesterone increases during the winter months reaching its peak in February⁵. The secretion of progesterone could be induced by mating or could follow spontaneous ovulation as the animals are kept together⁶. The testosterone concentrations measured do not follow the trend defined by Johnson et al.⁷ Further invasive analysis will therefore be necessary in order to establish the causes of infertility. These measures include the capture and the sedation of the animal, followed by an exam of the quality and quantity of semen produced and a specific ultrasound scan of the reproductive tract. Future studies, using a non-invasive method of monitoring, aimed at increasing knowledge on reproductive physiology (behaviour and endocrine information) in both sexes should enable us to strengthen management programs⁸. As well as studying reproductive aspects, it is also essential to offer an adequate habitat (environmental enrichment) in which the animal can adapt, grow and reproduce without developing anomalies or stereotypies. Only by doing so it will be possible to improve the biological functions and guarantee the well-being of these animals⁹.

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