

SUMMARY

The De Wildt Cheetah Breeding & Research Centre of the National Zoological Gardens of South Africa was established in 1971 with the aim of breeding enough cheetahs (Acinonyx jubatus) for display purposes in Zoological Gardens and to make animals available, where possible, for release into suitable natural areas. At the commencement of this undertaking cheetahs were regarded as being very difficult to breed in captivity. The present study investigated two postulates; First that captivity had a deleterious effect on the fertility of the male cheetahs; and secondly, that the appropriate management of the captive population was essential for the stimulation of sexual activity. The fertility of the male cheetahs was examined and males were selected on the basis of their semen quality for inclusion in the breeding program. Semen was collected by electroejaculation from cheetah males immobilized with a combination of ketamine and xylazine or with CT1341. Semen quality was evaluated using standard methods. Fresh semen samples were examined for motility, percentage live and density. Spermatozoal morphology was examined using stained semen smears.

Plasma testosterone was determined in cheetah males bled at 2 hourly intervals for 24 h. Thereafter an intramuscular injection of 50 µg GnRH was used as a standard stimulus. Plasma testosterone concentrations, after GnRH, were measured in cheetah males from different age groups, at different times of the year, in electroejaculated animals and animals with differences in

assessed semen quality. The effect of a rise in cortisol concentration, measured during and after electroejaculation, on plasma LH and testosterone was also examined.

The management of the cheetah population was changed from one in which cheetahs were kept as a heterosexual group. Cheetah females were kept singly in individual enclosures and the males were kept in groups far removed from the female area for most of the year. During November and for the following 2 to 3 months male groups were introduced into the passage between the female enclosures and the animals were observed for signs of breeding activity. When behavioural oestrus was observed a single male, selected because of good semen quality, was introduced into the female's enclosure and left there for 2-3 days.

Sperm motility, percentage live and semen density were found to be more reliable than spermatozoal morphology as parameters of fertility in cheetah males. Litters were born to females that had been mated by males with normal spermatozoal counts of 18 - 80 %. Fifty percent of the litters produced between 1975-1984 were sired by males with normal sperm counts of less than the population mean of 47,6%.

A marked variation in plasma testosterone concentration was measured in cheetah males bled for 24 h. An intramuscular injection of 50 µg GnRH was followed by a maximal testosterone concentration in the plasma 120 - 200 min later. The maximum plasma testosterone concentrations measured after 50 µg GnRH in cheetah males aged eighteen months were significantly lower than those of older animals. No differences were seen in the response

to GnRH during July and November. The testosterone response was not affected by anaesthesia or a rise in plasma cortisol concentration. There was no correlation between semen quality and the plasma testosterone response to GnRH.

The management of the captive cheetah population appears to have been the most important factor in the success achieved. The introduction of cheetah males into the female area was followed within a few weeks by oestrus in the females. Interaction between males in the group appeared to stimulate libido and cheetahs were often seen to mate soon after a male was released into the female's enclosure. Between 1975 & 1984 > 240 cheetah cubs were born from 71 litters.

OPSOMMING

Die De Wildt Jagluiperd Teel- en Navorsingsentrum van die Nasionale Dieretuin van Suid-Afrika is gestig in 1971 met die doel om genoeg jagluiperds (Acinonyx jubatus) te produseer vir vertoning in dieretuine en ook om, indien moontlik, diere beskikbaar te stel vir vrystelling in geskikte natuurlike gebiede. Met die begin van hierdie onderneming is die teel van jagluiperds in gevangenskap as baie moeilik beskou. Die huidige studie het twee stellings ondersoek; eerstens dat gevangenskap die vrugbaarheid van jagluiperds nadelig beïnvloed en tweedens dat die geskikte bestuur van die jagluiperdpopulasie noodsaaklik sou wees om seksuele aktiwiteit te stimuleer.

Die vrugbaarheid van jagluiperdmannetjies is ondersoek en hulle is op grond van hulle semenkwaliteit gekeur vir gebruik in die teelprogram. Jagluiperdmannetjies is met 'n mengsel van ketamien en xylazien of met CT1341 geïmmobiliseer en semen is deur elektroejakulasies versamel. Semenkwaliteit is volgens standaardmetodes ge-evalueer. Vars semen is ondersoek vir motilitiet, persentasie lewendig en digtheid. Hierna is gekleurde semensmere gebruik vir die morfologiese ondersoek van spermatozoa.

Plasma-testosteroonkonsentrasies is bepaal in plasma van jagluiperdmannetjies wat elke 2 uur vir 24 h gebloei is. Hierna is die binnespiersse toediening van 50 µg van LH-vrystellingshormoon (GnRH) as 'n standaardstimulus gebruik. Plasma-testosteroonkonsentrasies, na GnRH, is bepaal in diere van

verskillende ouderdomsgroepe, gedurende verskillende tye van die jaar, in mannetjies waarvan semen deur elektro-ejakulasie versamel is en in diere met verskille in semenkwaliteit. Die invloed van 'n styging in plasma-cortisolkonsentrasies, gemeet gedurende en na elektro-ejakulasie, op plasma-LH en -testosteroon vlakke is ook bepaal.

Die bestuur van die jagluiperdpopulasie is verander deurdat heteroseksuele groepe verdeel is. Jagluiperdwyfies is alleen in afsonderlike kampe aangehou is en die mannetjies is in groepe so ver moontlik van die wyfies weggehou. Gedurende November, en 2 tot 3 maande daarna, is jagluiperdmanntjies na die gang tussen die wyfiekampe gebring. Die gedrag van die diere is dopgehou. Sodra 'n wyfie estrus getoon het is 'n mannetjie, geselekteer vir goeie semenkwaliteit, in haar kamp toegelaat.

Spermmotiliteit, persentasie lewendig en digtheid is blykbaar meer betroubaar as spermmorfologie as parameters van vrugbaarheid in jagluiperdmanntjies.

Werspels is gebore nadat wyfies gepaar het met jagluiperd mannetjies met normale spermtellings van 18 - 80%. Vyftig persent van die werpsels wat tussen 1975 en 1984 geproduseer is, is deur mannetjies met normale spermtellings minder as die populasie-gemiddeld van 47,6% verwek.

Aansienlike variasies in plasma-testosteroonkonsentrasies is gemeet in die jagluiperdmanntjies wat oor 'n tydperk van 24 h gebloei is. Die binnespiersse toediening van 50 µg GnRH is gevolg deur die bereiking van die maksimum testosteroonkonsentrasie na 120 - 200 min. Maksimum plasma-testosteroonkonsentrasies na 50 µg

GnRH in 18 maand oue jagluiperdmannetjies was betekenisvol laer as die van ouer diere. Geen verskille in plasma-testosteroonkonsentrasies is getoon na GnRH in Julie en November van dieselfde jaar nie. Die plasma-testosteroonrespons is nie deur narkosemiddels beïnvloed nie. Verhogings in plasma-cortisolkonsentrasies het nie plasma-testosteroonkonsentrasies asook die plasma-testosteroonrespons op GnRH beïnvloed nie. Geen korrelasie is gevind tussen semenkwaliteit en plasma-testosteroonkonsentrasies nie.

Die bestuur van die jagluiperdpopulasie is skynbaar die deurslaggewende faktor in die teelsukses wat behaal is. Jagluiperdwyfies het estrus getoon binne 'n paar weke nadat die mannetjies in die gang tussen hulle kampe losgelaat is. Interaksie tussen mannetjies in die groep het oënskynlik libido gestimuleer en paring is telkemale gesien kort nadat mannetjies in die wyfiekampe vrygestel is. In die tydperk 1975 - 1984 is > 240 jagluiperd welpies gebore van 71 werpsels.

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