

Reproductive behaviour repertoire of semi-captive lowland tapir *Tapirus terrestris* (Linnaeus, 1758)

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Resumo

Comportamento reprodutivo de antas, *Tapirus terrestris* (Linnaeus, 1758), em semi-cativeiro. O comportamento reprodutivo de cinco machos e duas fêmeas antas (*Tapirus terrestris* (Linnaeus, 1758)) em semi-cativeiro foi investigado ininterruptamente por dois anos. Os animais estavam numa área cercada de 160ha, no Estado de Santa Catarina, sul do Brasil. Os dados foram coletados sempre que um animal exibisse comportamento reprodutivo. Sete comportamentos observados em 11 eventos reprodutivos foram divididos em três categorias: corte, cópula e pós-cópula. As antas apresentaram padrões comportamentais reprodutivos estereotipados. Nenhum tipo de vocalização detectável foi registrado durante o período. A atividade reprodutiva iniciou na segunda metade de julho até a metade de outubro, nos dois anos de observação, sugerindo a existência de uma estação reprodutiva. Além disso, houve dois nascimentos após gestações esperadas de cópulas registradas.

Unitermos: corte, anta, flehmen, cópula, comportamento reprodutivo

Abstract

The reproductive behaviour of five male and two female semi-captive *Tapirus terrestris* was investigated for two years without interruption. They were fenced in a 160 hectare area, in Santa Catarina State, South of Brazil. Data was collected whenever an animal exhibited reproductive behaviour. Seven behaviours, observed in eleven reproductive events, were divided into three categories: courtship, copulation and post-copulation. The tapirs displayed stereotypical patterns of sexual behaviour. No kind of audible vocalization was recorded during the reproductive period. All reproductive activity began in the second quarter of July and continued up to the first half of October, in both years of observation, pointing towards the existence of a reproductive season, corroborated by two births after expected gestation period from copula.

Key words: courtship, tapir, flehmen, copulation, reproductive behaviour

Introduction

All tapir species are quite similar in terms of reproductive biology. Oestrous cycles occur every 50 to 80 days; males copulate when females are in heat at least once in each oestrous period. Tapirs breed a single offspring after 11 to 14 months of gestation, and there seems to be no seasonal reproduction (Salas and Kim, 2002). The vast majority of literature on tapir reproductive biology is based on the analysis of the behaviour of captive animals. Although it is known that the majority of ungulates carry out reproductive behavioural patterns that demand ample areas for fulfilment, especially for courting (Estes, 1992), descriptions of reproductive habits of tapir species are frequently based on the observation of animals held in captivity, where behaviours may be modified due to the lack of space or to particular handling conditions and environmental pressure (Torres et al., 2004). Such is due to the fact that the study of natural living lowland tapir (*Tapirus terrestris*) is made difficult by their solitary, nocturnal and discreet behaviour (Emmons and Feer, 1997; Eisenberg and Redford, 1999). Observations carried out in semi-captivity may better reflect the lowland tapir's reproductive habits in natural habitats. Such knowledge may contribute to the understanding of the behaviour of the species in captive environments, improving management practices of animals kept for education, conservation or other purposes. As such, the objective of this research was to study the reproductive behaviour of the lowland tapirs in a fenced area of 160 hectares of marsh vegetation on the coastal plains of the State Park of Serra do Tabuleiro (STSP), Santa Catarina, Southern Brazil.

Materials and Methods

Seven tapirs, five males (four adults and one young) and two adult females were observed in the "visitors centre", a 160ha fenced area, which is part of the Serra do Tabuleiro State Park, a 90.000 ha conservation area located at 27°50'S and 48°50'W, Southern Brazil. The visitors centre is a semi-captive environment with walks amidst marsh vegetation.

In the visitors centre's dryer areas of sand dunes, vegetation is predominantly made up of herbs and shrubs (mostly *Melastomataceae*) and of a few trees and shrubs (basically *Myrtaceae*). In the marsh fields, however, vegetation is basically made up of *Cyperaceae* and *Typhaceae* (Klein, 1981). The predominant climate of the region, according to the Köeppen system, is mesothermic humid (Cfa type), with hot summers. Annual precipitation is approximately 1600mm, with no dry season (GAPLAN, 1986).

Local plants are the base of the tapirs' diet in the park (Santos et al., 2005). However, on weekday mornings (from Monday to Friday), tapirs and other wild animals - greater rheas, (*Rhea americana*) and capybaras (*Hydrochaeris hydrochaeris*) -- of the visitors centre are fed pumpkin, cassava, cabbage, lettuce, banana, papaya and equine ration (Bevilacqua and Tortato, 2003). This supplement is not intended to nutritionally balance daily requirements but is granted as an extra feed to the animals. Not all tapirs feed on these supplement, and the meal typically lasts for 90 min. With the exception of this supplement, there is no handling program, neither any veterinary nor any other kind of assistance to the animals.

Individuals were recognized by individual markings and fur colour. Information was registered from January 2004 to January 2006, at least twice monthly, during field visits to the tapirs' habitat. Observations of animals were circumstantial, whenever reproductive behaviour was noticed. Records were made by direct visual observation of individuals during the day period, from 8:00 a.m. to 4:00 p.m. Whenever an animal initiated any kind of reproductive behaviour, it was then considered a focal animal, and all reproductive behaviours were from then on registered (Altmann, 1974) by two observers.

Results

Throughout the whole period, 11 observations of lowland tapirs engaging in one or more of the behaviours described below were made. All reproductive behaviours occurred between mid-July and mid-October, in both years of observation. During the two-year

observation period, three couples were formed. Two births, one in 2004 and another in 2005, were registered between August and September.

Reproductive activity was never accompanied by any kind of audible vocalization. During the period of sexual activity, the females presented swollen vaginas and constant secretion, sometimes dripping to the ground. Three classes of behaviours, described below, were identified: courtship, copulation and post-copulation.

Courtship

The behavioural category of courtship was observed in eight occasions, in which one or more of the following behaviours occurred. The male approached the female to sniff, lick the vagina and perform *flehmen*¹. In most occasions, following this behavioural pattern, male erection was also observed. During the latter sequence, the female contracted the vagina, squirting urine on the male's face. First approaches occurred. The male tried to approach the female, as she ran in circles or a few meters away. The male ran after her, as both spent various minutes on this event. Throughout this ritual, in three occasions, both interrupted racing to either smell or lick each other. In three occasions the male tried to mount, the female ran away and racing was resumed. At times, one bit the other's rumps. Long races have been observed, when the male ran long distances after the female. This behaviour went on for hours, with some interruptions when the female eased her pace, either walking or trotting. The male then followed her ease; sometimes racing suddenly after her again, sometimes sitting and resting with her in between races. Male erection was mostly observed during the slower events, and in half of the occasions, other males were present. In most situations, the male approached to sniff and lick the female's hindquarters. He would then try to touch her hindquarters with his snout. If the

female ran, events above were thus repeated. However, if the female was receptive, both would walk very slowly with the male's chin on the female's rump. At this moment, the male invested in mounting.

Copulation

If the female stood in response to the male's touch on her hindquarters, copulation then started. He would then lift both front legs, leaning his breast on the female's quarters. The female lowered her back quarters, and copulation occurred. Three copulations were observed; each for about one minute long. A couple was observed to have copulated twice during a day, with a three-hour interval.

Post-copulation

Twice, following the observed copulations, we noticed post-copulative behaviour. After copulating, the female walked calmly, with the male following her quite closely, touching her at times. The two couples were seen together as they rested under the bush after copulation. In one occasion, four days after copulation, one female was noted to have responded aggressively to male contact.

Discussion

In general all ungulates follow a similar pattern of reproductive stages, marked by behavioural and physiological changes (Matthews, 1977; Estes, 1992; Fraser, 1992; Lynch et al., 1992, Peters and Balls, 1994). Male recognition of the reproductive state of the female by means of olfactory and taste senses (smelling and licking the vagina), made evident by *flehmen*, has been amply observed among perissodactyla, such as equine (Estes, 1992; Fraser, 1992) and captive Baird's tapir (Torres et al., 2004) as well as among artiodactyla, such as cervids (Jackson, 1985), bovine, giraffe, swine (Estes, 1992), sheep (Lynch et al., 1992) and antelopes (Matthews, 1977). Behavioural patterns are strongly present among subfamilies and tribes of ungulates (Estes, 1992). Among perissodactyla, the Equidae family is the most phylogenetically related to the Tapiridae, in both mor-

¹ Flehmen: or lip curling reflex: "a response to pheromones, manifested by inhalation followed by distinct upward curling of the upper lip and dorsiflexion of the neck. Lip-curling is most noticeable in male ungulates when in proximity to estrous females or when examining their genitalia, urine, or urine marking" (Hurnik et al., 1995).

phological and genetic terms (Murphy et al., 2001). In fact, the tapirs in this study presented many reproductive behavioural events in common with horses. Horses are known to practice *flehmen*, race in circles, lick, bite and strike each other. Female horses squirt urine and mucus on the male's face and males lean their chins on the females' rumps (Fraser, 1992) in ways similar to those observed among the semi-captive lowland tapirs of STSP. Another behaviour frequently noted among ungulates and registered in this study is the habit of urinating during courtship (Estes, 1992; Fraser, 1992; Lynch et al., 1992). Several of the behaviours observed in this group of *T. terrestris* were reported in a couple of *T. bairdii* held in a 400m² enclosure (Torres et al., 2004), confirming that similar patterns of reproductive biology and behaviour are shared by different *Tapirus* species. In captive tapirs, running and pinching behaviours prior to copulation, likely analogous to the ones reported in our study, are considered potentially hazardous in enclosed environments (Shoemaker et al., 2003).

According to Estes (1992), solitary female ungulate in Africa remain receptive for days or up to some weeks, whereas gregarious ungulate females remain receptive in general for one day only. He also reports that the latter exhibit longer, more complex and exhibitive courtships and mounts, whereas the former realize more rapid mounts, as registered with the present semi-captive lowland tapirs. Torres et al. (2004) report vocalizations in captive males and females of *T. bairdii* during courtship, but audible vocalizations to human hearing were not noted in our study. On the other hand, we have noted at least four different kinds of vocalizations among the same tapirs in several non-reproductive situations. Perhaps this difference is due to the fact that the animals observed by Torres et al. (2004) were in a small enclosure, compared to the animals we observed roaming freely in a much larger area.

Matthews (1977) described the post-copulative behaviour of kob ungulates (*Kobus kob*), gazelles (*Oryx gazella*) and goats (*Capra* spp) in which the male and the female remained close together, touching one another. This behaviour generally took place before the female moved away from the male, as with the semi-captive tapirs of STSP. Eisenberg and Redford (1999)

comment that males of *T. pinchaque* may fight severely to gain mating rights to a sexually receptive female and, while fighting, males attempt to bite each others' hind feet. Female aggressiveness towards the approach of the male when out of the reproductive period was observed among the tapirs of this study, as has been noted in many ungulates by Estes (1992).

Eisenberg and Redford (1999) claim that there appears to be no seasonal pattern of reproduction in tapirs kept either in captivity or in the wild. Although our sample size is far from ideal to discuss seasonality of reproduction, our data suggest that, at least in the studied region, lowland tapir show a seasonal pattern of reproduction. A reproductive season beginning in the middle of the winter (July) and going up to the middle of spring (October) was noted. Considering a gestation of 11 to 14 months (Salas and Kim, 2002), and the recorded breeding season, births were expected to occur near or during the period of greatest availability of vegetable resources. Indeed, the two births observed in our study occurred at this time of the year.

It is well known that the majority of ungulate births are concentrated in the spring and the beginning of the summer periods, when most resources are available. In the studied area, the transition from winter to spring, when reproductive activity was observed, is concurrent with the transition to a period in which flowers and fruits bloom and vegetable leaves and sprouts grow, consequently greatly increasing biomass and nutritional quality for ungulates. Even though the tapirs in this study receive some amount of supplement, it is not enough nor intended to compensate seasonal fluctuations in feed availability. Therefore, we can assume that most of their nutrients are obtained from natural vegetation (Santos et al., 2005). As most other ungulates of Brazil (Eisenberg and Redford, 1999), *T. terrestris* might have a reproductive period starting just before the wet season.

In summary, tapirs here studied presented stereotypical patterns of sexual behaviour, including the manifestation of *flehmen*, with mount occurring after a long behavioural sequence. All reproductive activity occurred in between the end of winter and spring, thus suggesting the existence of a reproductive season.

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