# SOCIAL BEHAVIOR BETWEEN MOTHERS × YOUNG OF SLOTHS *Bradypus variegatus* SCHINZ, 1825 (XENARTHRA: BRADYPODIDAE)

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## ABSTRACT

This study is a contribution to the *ex situ* and *in situ* conservation and preservation of Sloths. The behavioral records of the social interaction between mothers and offspring allow the detection of important learning interactions and psychomotor development. The results provide valuable information that may assist in improving management conditions of captive orphan progeny. They also favor a more effective monitoring of released or transferred specimens. Age is of fundamental importance in deciding what is important during the release, transfer, or reintroduction of the species.

*Key words*: sloths, behavior, offpring, *Bradypus*, Atlantic Forest.

## RESUMO

**Comportamento social entre mães × filhotes de preguiças *Bradypus variegatus* SCHINZ,1825 (Xenarthra: Bradipodidae)**

Este estudo é uma contribuição para a conservação e a preservação *ex situ* e *in situ* de preguiças, sobretudo nesta fase de dependência de filhotes. Foi detectado, neste estudo, que as interações de aprendizado, sobretudo as de caráter alimentar, e o desenvolvimento físicomotor dependem da transferência de comportamentos da mãe. Esta interação materna com filhotes é, portanto, de fundamental importância para o desenvolvimento dos filhotes. Animais desprovidos desse aprendizado, como é o caso de animais órfãos, são mais susceptíveis a óbito quando são translocados ou reintroduzidos em seu habitat natural.

*Palavras-chave*: preguiças, comportamento, filhotes, *Bradypus*, Floresta Atlântica.

## INTRODUCTION

The behavior between mother and young of Sloths in the wild is undoubtedly a complex issue and of difficult interpretation, since it inevitably implies approaches with little consideration for what these socio-interactions actually represent. The order *Xenarthra*, Cope 1889 (= Edentata), encompasses a total of 4 families, 13 genera, and 29 species, represented by 20 species of Armadillos (*Dasypodidae*), 4 species of Anteaters (*Mymercophagidae*), and 5 species of Sloths, which are distributed in 2 families: *Bradypodidae* and *Megalonichidae*. The *Bradypodidae* family groups the Sloths of the genus *Bradypus* which includes 3 species: *Bradypus torquatus* (Maned sloths), *B. tridactylus* (True three- toed sloths), and *B. variegatus* (Brown throated three-toed sloths). The Megalonichidae family groups only two species: C*holoepus hoffmanni* and *C. didacylus* (generally and respectively known as Hoffmanni's sloths and True two-toed sloths) (Wetzel & Kock, 1973; Wetzel, 1985; Wetzel & Ávila-Pires, 1980).

Geographically, the *Xenarthras* are considered endemic and typical to the Neotropical region, occurring throughout the South American continent

and in part of Central America (Cartelle, 1994). The primitive features of the xenartras (armadillos, vermilinguas, and sloths) reinforce even more the possibity of underestimating their cognitive capacity, psychomotor development, and learning capacity, especially if compared to other mammals that have been studied for a longer period, as in the case of primates, cetaceans, canides, and some perissodactiles (Soares, 1999).

Social interactions among sloths are considered to be rare, mainly because these animals are known for their solitary habits. However, some reports represent attempts to understand to a greater extent some of the sloths' social interactions in captivity or in the wild. In this context, a study focused on indirect contact through vocalization between mother and young of *Choloepus hoffmanni* and *Bradypus infuscatus* (= *Bradypus variegatus*) (Montgomery & Sunquist, 1974). It showed that vocalization is quite intense and important to communication in the first 6 months of total infant dependence. In the 80s some work on reproduction and captivity of C*holoepus didactylus* concluded that after a gestation of approximately 5 to 8 months, only one offspring was born (Merrit, 1985).

The mother keeps the young under intense care, making possible the registration of the development and learning improvement (Eisenberg & Maliniak, 1985).

*Choloepus hoffmanni* females together with their babies were monitored in captivity in the Lincoln Park Zoological Garden and also in Panama where the ingestion of the placenta and rhythmic unidirectional licking of the newborn by the mother, mainly on the face and genital and urinary area, was observed. The baby's posture becomes more and more specialized and reaches greater levels of difficulty (Merrit, 1985). Motor behavior evidently improves, with every attempt, in contact with their mother. Independent exploration of the habitat by the baby was registered after only 41 days for females, and 54 days for the males of *C. hoffmanni* (Merrit, 1985).

The purpose of the present field research is to investigate and understand some social interactions occurring in the early biological cycle of a single sloth species occurring in the State of Pernambuco (NE, Brazil): the *Bradypus variegatus*. The observations here presented portray interactions of great importance in the development of sloth offspring, for their motor development and the acquisition of confidence necessary for moving in treetops, while learning self-feeding abilities, self-defense etc. or eliminating feces and urine.

## MATERIAL AND METHODS

This study was carried out in the Refugio Ecológico Charles Darwin – RECD (Charles Darwin Ecological Refuge) located on 60 hectares of Atlantic Rainforest on northern coast of Pernambuco, Brazil. Four females together with their babies, and 5 captivity orphans, were observed, all of the *Bradypus variegatus* species Schinz, 1825 (*Bradypodidae*, *Xenarthra*, *Mammalia*), brought by IBAMA (Brazilian Environmental Agency) to the Rehabilitation and Recovery of Wild Animal Center, located in the RECD. The behavioral samples were registered by means of the Focal Animal Technique (Altman, 1974), totaling 970 hours of direct observation of the animals.

## RESULT

In any situation, the young sloths mainly clung to their mother's venter, independently of her position or movement. A vertical movement of a female with her baby (monitored for 21 consecutive days) was observed during nocturnal defecation. During the descent, the baby, carefully placed in its mother belly, is protected by her body and by the substratum (tree). The baby's dorsal region remains turned towards the tree during the climbing or the descent movement. The various baby activities occurred mostly during daytime. The baby's motor activities were markedly simulations of climbing in tree branches. The mother assumes a clear body position, which sometimes facilitates, and other times hinders the baby's voluntary movements. Exploration and play activities were characterized by specialized movements of extension and flexion of the claw; pronation and supination of the front limbs; attempts at grasping leaves and climbing the branches; and rhythmic claw beats on the mother's body, on its own body, and on the branches and leaves, simulating the behavior pattern observed in adult specimens during the body cleaning activities. The reverse hang attitude (upside down) was observed in two distinct situations:

a) Babies clung to their mother belly; when she turns, the babies also turned (dependent inversion).
b) Only the babies, with the mother in whatever position (independent inversion), execute the reverse movement.

Inversion posture acquisition is more frequent in *B. variegatus* young specimens than in adults. Although this upside-down attitude can be physiologically and behaviorally discussed, its real function is still unknown. The interpretations of the field events connected with the sloth's social learning in the wild depended largely on sensory manifestations of these animals, such as visual focus on the mother's activities, whether repeated or not. This includes olfactory, tactile, and apparently visual focus on most items explored by the mothers as food sources. The mother were recorded supplying food to their babies, which were seen feeding themselves only on the plants ingested and supplied by their mothers. After 48 days without sighting one of the females with her baby, phenotypically identified, the baby was observed moving 6 times away from its mother in less than 5 minutes, in the interval between 11:25 h and 15:51 h, being assisted by her only in one of the events, in which it showed difficulty in moving closer to the mother. This difficulty was signified by hissing sounds and uncoordinated climbing. It was recorded that the baby's moving away routes were, step for step, repeated during the mother's returns.

## DISCUSSION

The baby's ventral positioning is likely to provide greater protection by the mother's body and by the substratum, thus avoiding predator attacks. Likewise, this positioning may provide greater safety during the mother's dislocations, minimizing the possibility of falls, or even during breast-feeding since the only pair of milk-producing glands is near the armpits. The supply of leaves by the mothers to their babies can be interpreted as an important feeding skill especially considering that the captive orphans are more inclined to eat poisonous leaves or harmful objects. Bodly cleaning activities between the mother and babies of Sloths, as well as the movement of the baby on its mother body, apparently contribute to motor improvement and confidence level. The behavior of exploring routes and distances by themselves is likely to be of fundamental importance in acquiring habitat recognition.

This activity hypothetically insures more safety for the baby if for some reason it loses track of its mother. The records indicate that the baby's playing behavior, while in its mother is company, is independent and distinct. Nevertheless, the dependency stage is essential to its learning. Individuals deprived of such interactive contacts, as was observed in the five captive orphans, may show motor, biological, and behavioral deficiencies, which in turn, may interfere in under unfavorable conditions, whether the offspring are wild or following rehabilitation and transfer to their natural environment.

This study is an attempt to collaborate in elucidating of the psycho-motor learning behavior between mother and offspring of *B. variegatus* sloth species, emphasizing that the early relationship is likely to be essential to the success of the development and survival of these animals, at least until they become, able to live independently of mother care. This conclusion is reinforced by the follow-up of orphan progenies, which are more vulnerable to eating items not ordinarily found in the wild and also objects experimentally offered them. In such cases, the young show no hesitation to feed on these items which probably could be lethal. Young orphans also show a certain fear of height, which allows the conclusion that the deslocations performed together with the mother in the treetops are essential in improving and encouraging their own movements, according to the biological peculiarities of these animals.

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