

Alloparental Behavior in the Capybara (*Hydrochoerus hydrochaeris*)

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The alloparental behavior of two family groups of capybaras was studied. Each group comprised one male, four females and two litters of four animals each, maintained in breeding pens of 120 m². We analyzed the frequency with which each female suckled her own young and those of other females and also the proximity between individuals of the group. All females suckled all the young and did not discriminate between their own and others' young. This study confirms reports on the capybara's alloparental behavior observed in the wild and sheds light on the species' social organization which can have important implications for captive breeding and behavioral research settings.

Index terms: Animal maternal behavior. Animal social behavior. Capybara.

O comportamento aloparental da capivara (*Hydrochoerus hydrochaeris*). O comportamento aloparental de dois grupos familiares de capivaras foi estudado. Cada um dos grupos era composto por um macho, quatro fêmeas e duas ninhadas de quatro filhotes, que eram mantidos em cativeiro em baias de 120 m². Foi analisada a frequência com que cada fêmea amamentou a própria ninhada e a de outra fêmea. Também foi analisada a proximidade entre os indivíduos do grupo. Os resultados deste estudo mostram que não há nenhuma discriminação entre os filhotes aparentados, pois todas as fêmeas amamentaram todos os filhotes de seu grupo. É sugerida a existência de uma relação entre comportamento aloparental e hierarquia de dominância social. Este estudo confirma registros sobre o cuidado aloparental entre capivaras observado na natureza e lança questões a respeito da organização social da espécie, que têm importantes implicações para a criação em cativeiro.

Descritores: Comportamento materno animal. Comportamento social animal. Capivara.

The capybara (*Hydrochoerus hydrochaeris*) lives in social groups varying from one male and two females up to 100 individuals, with several adults of both sexes and their offspring (Azcarate-Bang, 1980). Azcarate-Bang (1978)

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studied the species' social interactions and concluded that they form cohesive groups characterized by a complex social structure with a dominance hierarchy and individual specialization of functions. The capybara society comprises a dominant male, several females and their young and one or more subordinate ma-

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les (Ojasti, 1973). The dominant male protects the group, is possessive of the females and, through attacks maintains the subordinate males at the periphery of the group. These satellite males sometimes copulate with young females in estrus (Macdonald, 1981; Ojasti, 1973; Shaller & Crawshaw, 1981).

Some authors have suggested the existence of cooperative care among capybaras in the wild (Macdonald, 1981; Ojasti, 1973). In many mammals birds and social bees and wasps, adults other than parents take care of offspring (A. J. Backer, A. M. Backer, & Thompson, 1996; Wilson, 1975). This alloparental behavior has been recorded among very varied animals living in small groups. It is characterized by the young staying with related adults of the group until weaning or until they reach sexual maturity (Reidman, 1982; Wilson, 1975). The capybara society have cooperative care (Macdonald, 1981); the young remaining in the original group until they reach sexual maturity when females can be incorporated and males expelled after a hierarchical dispute with the dominant male (Ojasti, 1973). Expelled members often form new groups (Ojasti, 1973; Shaller & Crawshaw, 1981).

As no quantitative information on alloparental care among individuals of this species in captivity is available, this study analyzed suckling behavior to investigate possible preferences of the females in suckling her own offspring or whether they indiscriminately suckle the young of others.

Methods

We observed two capybara groups whose members were born in the Departamento de Produção Animal of the Escola Superior de Agricultura “Luiz de Queiroz” of the Universidade de São Paulo, in Piracicaba, São Paulo, Brazil.

The first group (group A) comprised one adult male (Ma - 9 years old), two adult females (Fa and Fb - both 10 years old), one subadult

female (Sa - 11 months old) and one juvenile female (J - 5 months old), and two litters totaling eight young, one litter with four youngs belonging to female Fa (La₁ and La₂), and one litter with four young belonging to female Fb (Lb₁ and Lb₂). The second group (group B) comprised one adult male (Mb - 5 years old), three adult females (Fc and Fd - both 10 years old and Fe - 6 years old), one subadult female (Sb - 10 months old) and two litters totaling each four young; one belonging to female Fc (Lc₁ and Lc₂) and one to female Fd (Ld₁ and Ld₂). The females of the two groups were unrelated but they were known to each other, having been together since weaning at 60 days old (Nogueira, Nogueira-Filho, Otta, Dias, & Carvalho, 1999).

The groups were maintained in separate pens. These were 120 m², comprising a sheltered area (22 m²), which protected animals from rain and sun and an unsheltered or exercise area (98 m²) where there was a sunken water tank of 3 m x 2 m and 1 m deep.

Two infants of each litter were chosen for observation. In order to aid identification without the observer entering the pen the experimental animals were marked individually with human hair dye.

The animals were observed during their first month, which is the period of greatest suckling (Nogueira, 1997). Each observation session lasted one hour between 12:00 h and 14:00 h totaling 20 hours of data collection for each group.

The duration of each suckling bout was recorded and the female involved by the “all occurrences” sampling method (Altmann, 1974). The locations of all animals of the group were recorded every 15 minutes by the scan sampling method (Altmann, 1974).

From the animals' locations it was possible to verify the distances between individuals and the frequencies at which each individual was close to the others in the scan moments. The distance analysis was chosen because capybaras have been described as living in “an amicable

society, almost an inert one” (Macdonald, 1981), with subtle social interactions and long resting periods. Using this analysis, we investigated the infants’ preferences for being closer to their mothers or to other group members.

Suckling data were analyzed through the chi-square test and the distance between individuals through the hierarchical grouping procedure, by cluster analyses using the average linkage method. Both analyses were carried out using the software Minitab for Windows (version 10.2).

Results

None of the mothers showed any significant difference between the suckling frequency of their own and those of other (group A: $c^2 = 0.819$; $DF = 1$; $p > 0.05$ and group B: ($c^2 = 0.114$; $DF = 1$; $p > 0.05$) (Tables 1 and 2). Nor was there any significant difference between the suckling frequency of the two females of group A ($c^2 = 1.614$; $DF = 1$; $p > 0.05$), although in group B, Fd suckled more frequently than Fc ($c^2 = 11.076$; $DF = 1$; $p < 0.01$).

Table 1. Suckling frequency by own or other mother in capybaras of group A. Fa: mother of litter La; Fb: mother of the litter Lb. Number expected frequency values in parentheses.

Litter\Mother	Fa	Fb	Total
La	19 (17.06)*	21 (22.93)	40
Lb	13 (14.93)	22 (20.06)	35
Total	32	43	75

Table 2. Suckling frequency by own or other mother in capybaras of group B. Fc: mother of litter Lc; Fd: mother of the litter Ld. Number of expected frequency values in parentheses.

Litter\Mother	Fc	Fd	Total
Lc	7 (6.46)*	17 (17.53)	24
Ld	7 (7.53)	21 (20.46)	28
Total	14	38	52

In both groups the young of both litters spent more time nearer one of the females of the group (Fb and Fd) (Figures 1 and 2). The two subadult females (Sa and Sb) were isolated in both groups. The male (Mb) of group B stayed closer to the infants than the male (Ma) of group.

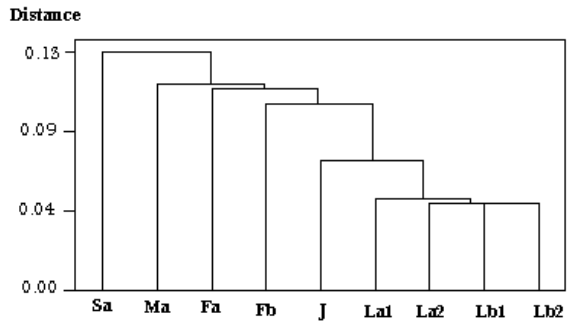


Figure 1. Distance between capybaras of group A. Sa: subadult female; Ma: male; Fa: mother of the litter La; Fb: mother of the litter Lb; J: juvenile female; La₁ and La₂: young of female Fa; Lb₁ and Lb₂: young of female Fb.

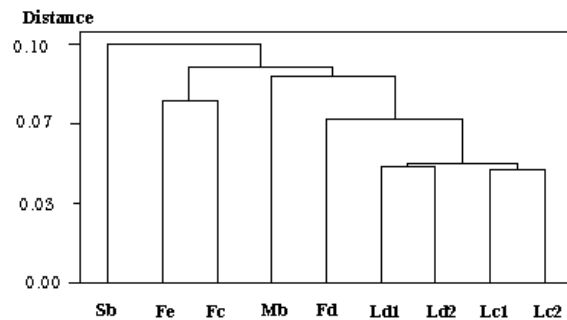


Figure 2. Distance between capybaras of group B. Sb: subadult female; Mb: male; Fc : mother of the litter Lc; Fd: mother of the litter Ld; Fe: adult female; Lc₁ and Lc₂: young of female Fc; Ld₁ and Ld₂: young of female Fd.

Discussion

The capybara females did not discriminate between young when suckling; each suckled her own young as often as those of others of her group. This result confirms observations of cross suckling in the wild (Macdonald, 1981; Ojasti, 1973).

Macdonald (1981) suggested that indiscriminate infant care can be related to the relationships between females of the group. These corroborate the kin selection explanation; that alloparental behavior occurs because it increases the probability of transmission of genes of related adults to future generations (Hamilton, 1964; Murphey, Penedo, Dacosta, Silva, & Souza, 1993; Quiatt, 1979; Taub, 1980). Capybara unrelated females or those do not grow up together since weaning, kill the infants of their pen mates (Nogueira et al., 1999).

In each pen the young remained more time with one of the mothers. In the wild, capybara females have been seen with 12 to 14 infants (Alho, Campos, & Gonçalves, 1987; Macdonald, 1981; Schaller & Crawshaw, 1981), but they cannot bear litters of more than seven (González-Jiménez, 1995; Nogueira, 1997). In this study, females Fb and Fd remained closer to the young than the other females. Furthermore, they were always the last to eat and were often expelled from most shaded positions when another animal required them; this behavior suggests they were subordinate females. Although we did not investigate the social structure of these groups, the data suggest that alloparental behavior may be related to the mothers' hierarchical position. Possibly subordinate females take more care of the young than do dominant females, but this suggestion needs to be investigated.

In the wild the peripheral males have greater access to the youngest females (Ojasti, 1973). We suppose that this situation may be due to the location of the subadult females (Sa and Sb), which often remained at the periphery of their respective groups. We also observed that one juvenile female (in group A) preferred to stay near to the young, but additional studies on ontogenetic behavior in capybara are needed to clarify the role of the young in the group.

In spite of animals being maintained in a small pens and the reduced number of animals involved, this study confirms reports on the capybara's alloparental behavior observed in the wild (Macdonald, 1981; Ojasti, 1973) and sheds

light on the hierarchical structure of the species, which can have important implications for captive breeding and behavioral research settings.

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