



Short communication

Caecotrophy in pacas (*Agouti paca* Linnaeus, 1766)

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Caecotrophy, a physiological process which was early documented in rabbits (MOROT 1882), is recognised to occur in mammals of different species (*Gorilla gorilla*: HARCOURT and STEWART 1978; *Phascolarctos cinereus*: OSAWA et al. 1993; *Hydrochaeris hydrochaeris*: BORGES et al. 1996; *Myocastor coypus*: TAKAHASHI and SAKAGUCHI 1998). Nevertheless, it has been best documented for lagomorphs and some rodents (STILLINGS and HACKLER 1966; PICKARD and STEVENS 1972; BJÖRNHAG and SJÖBLOM 1977; CRANFORD and JOHNSON 1989; SOAVE and BRAND 1991; MAROUNEK et al. 1995). These herbivores ingest differentiated faeces and absorb the protein and carbohydrates synthesized by caecal microorganisms.

The paca (*Agouti paca*) is the second largest neotropical hystricognath rodent with an adult average body weight of 8 kg. It is distributed from southern Mexico to northern Argentina, in practically all forest habitats up to 2000 m of altitude (WOODS 1984). This species has become locally extinct in overhunted areas of Central America (EMMONS 1990), and is considered vulnerable to extinction in some areas of Brazil, because of the reduction of its habitats and hunting pressure (AYRES et al. 1991; VICKERS 1991; BERGALLO et al. 2000). These mammals are mainly frugivorous

(MONDOLFI 1972), but SMYTHE et al. (1983) suggested that pacas could browse on leaves and seedlings during fruit shortage seasons.

A study of the behavioural patterns of 11 pacas in captivity was conducted at the Universidade Estadual Paulista, in Jaboticabal, Brazil between February and March of 1998. Animals were grouped as four mated pairs (three of them with a female offspring) housed separately in 10 m² pens, installed in an open outdoor area. The pens had a 1.7×0.7×0.35 m tank full of water; a brickwork den of 1.0×0.75×1.0 m with a mobile wood cover at the top, and a 0.30×0.30 m entrance near the floor closed by a mobile metal blind. Although living in captivity, these pacas showed nocturnal habits. Every morning around 9.00 h, faeces and remaining food were removed, drinking water was changed, the water tanks filled, and 1 kg of hay was placed on the floor, 0.8 m from the entrance of the artificial burrows. Each group was fed with approximately 240 g of rodent food at 9.00 a.m., and at 5.00 p.m. They received seasonal tropical fruit, green maize, and chopped raw manioc for evening and night consumption. To supply their need for gnawing, three to four fresh pieces of eucalyptus

tus branches, approximately 1.5 m in length and 5.0 cm in diameter, were provided to each pen, and exchanged for new ones after 15 days. The hay that remained outside the burrows was swept out of the pens every morning. Every ten days, the whole pen floor was washed, even inside the burrows after the hay had been removed, and the water tanks were brushed. All maintenance of the animals was performed by the same two staff persons, who had already been doing this work for at least one year before the study started.

Observations were registered by continuous recording (MARTIN and BATESON 1986), with all registry done in a descriptive manner by the same observer. Observations began in February 1998, and were conducted from 7.30 h a.m. to 3.00 h p.m. (daylight) for 40 consecutive days, for a total of 148 hours. Nocturnal observations were made from March to July of the same year, from 5.30 h p.m. to 10.00 h p.m., over scattered days for a total of 31 hours. The night schedule was selected, based on a previous study for 72 hours of continuous observation of the activity rhythm. These pacas showed an activity peak from 5.30 h p.m. to 10.00 h p.m. In addition, the animals were observed for two more days, between 6.00 h p.m. to 12.00 h a.m. and 12.00 h a.m. to 6.00 h a.m. In order to acclimate the animals to artificial light, two nights before each nocturnal observation two lamps (with 40 watt each, positioned 5 m equidistant) illuminated the four pens. Observations inside the burrows were possible since one corner of the wood cover was lifted 30 cm with a wire.

Although defecation occurred mainly at night, caecotrophy was detected only once during the nocturnal observations, and this caecotrophy was of already defecated faeces. Ingestion of faeces directly from the anus was, in contrast, only observed during daytime, always occurring inside the burrows. The paca can rest in the burrow using three different positions: with the belly upward and the four limbs flexed near the body; with the bodyside and cheek on the floor and the four limbs

stretched perpendicular to the body; and, with the sternum on the floor and the limbs close to the body (i.e.: the sternal position). Caecotrophy occurred when the animals were resting in the sternal position, by raising the chest off the ground, then putting the snout between the hind legs and repeatedly licking the anus; and finally lifting the head and chewing for about ten seconds, swallowing soon after. This cycle was repeated up to ten times. All adults and immature pacas over two months old showed this behaviour daily, throughout the diurnal observation period, however, one adult female performed caecotrophy during nocturnal observations.

Consumption of faeces by captive pacas has previously been reported (MATAMOROS 1982), but no mention was made of caecotrophy of differentiated faeces.

Since pacas have large intestines with a functional caecum (BENTTI 1981) and since they are phylogenetically related to hystricognaths who perform caecotrophy, the consumption of differentiated faeces should be interpreted as related to the feeding habits of pacas and not as an abnormal behaviour resulting from captivity (GRIER 1984). Although studies concerning the natural feeding habits of this species are lacking, pacas have been considered to be frugivores. The occurrence of caecotrophy and their digestive tract anatomy suggests that pacas may be more herbivorous than expected, often browsing on leaves, and not only when fruits are scarce.

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References

- AYRES, J. M.; LIMA, D. M.; MARTINS, E. S.; BARREIROS, J. L. K. (1991): On the track of the road: Changes in subsistence hunting in a Brazilian amazonian village. In: Neotropical Wildlife Use and Conservation. Ed. By J. G. ROBINSON and K. H. REDFORD. Chicago: Univ. Press. Pp. 82–92.
- BENTTI, S. B. (1981): Las lapas, roedores de América tropical. *Natura* **70/71**, 40–44.
- BERGALLO, H. G.; DUARTE DA ROCHA, C. F.; ALVES, M. A. S.; VAN SHYS, M. (2000): A fauna ameaçada de extinção do Estado do Rio de Janeiro. Rio de Janeiro. Editora da Univ.
- BJÖRNHAG, G.; SJÖBLÖM, L. (1977): Demonstration of caecotrophy in some rodents. *Swedish J. Agric. Res* **7**, 105–113.
- BORGES, P. A.; DOMINGUEZ-BELLO, M. G.; HERRERA, E. A. (1996): Digestive physiology of wild capybara. *J. Comp. Physiol.* **166**, 55–60.
- CRANFORD, J. A.; JOHNSON, E. O. (1989): Effects of coprophagy and diet quality on two microtine rodents (*Microtus pennsylvanicus* and *Microtus pinetorum*). *J. Mammalogy* **70**, 494–502.
- EMMONS, L. H. (1990): Neotropical Rainforest Mammals – a field guide. Chicago, London: Univ. of Chicago Press.
- GRIER, J. W. (1984): Biology of Animal Behavior. Times Mirror/Mosby College Publ, Missouri: D. Bowen.
- HARCOURT, A. H.; STEWART, K. J. (1978): Coprophagy by wild mountain gorillas. *E. Af. Wildl. J.* **16**, 223–225.
- MAROUNEK, M.; VOVK, S. J.; SKRIVANOVA, V. (1995): Distribution of activity of hydrolytic enzymes in the digestive tract of rabbits. *British J. Nutr.* **73**, 463–469.
- MARTIN, P.; BATESON, P. (1986): Measuring Behaviour – an introductory guide. Cambridge: Cambridge Univ. Press.
- MATAMOROS, Y. (1982): Notas sobre la biología del tepezcuinte, *Cuniculus paca*, Brisson (Rodentia: Dasyproctidae) en cautiverio. *Brenesia* **19/20**, 1–82.
- MONDOLFI, E. (1972): La lapa o paca. *Def. Nat.* **2**, 4–16.
- MOROT, M. CH. (1882): Des pelotes stomachales des léporidés. *Mém. Soc. Centr. Méd. Vét.* **12**, 139–239.
- OSAWA, R.; BLANSHARD, W. H.; OCALLAGHAN, P. G. (1993): Microbiological studies of the intestinal microflora of the koala, *Phascolarctos cinereus*. Pap. a special maternal faeces consumed by juvenile koalas. *Austr. J. Zool.* **41**, 611–620.
- PICKARD, D. W.; STEVENS, C. E. (1972): Digesta flow through the rabbit large intestine. *Am. J. Physiol.* **222**, 1161–1166.
- SMYTHE, N.; GLANZ, W. E.; LEIGH JR., E. G. (1983): Population regulation in some terrestrial frugivores. In: The Ecology of a Tropical Forest: Seasonal Rhythms and Long-Term Changes. Ed. By E. G. LEIGH JR., A. A. RAND, and D. M. WINDSOR. Washington D. C.: Smithsonian Inst. Press. Pp. 227–238.
- SOAVE, O.; BRAND, C. D. (1991): Coprophagy in animals – a review. *Cornell Vet.* **81**, 357–364.
- STILLINGS, B. R.; HACKLER, L. R. (1966): Effect of coprophagy on protein utilization in the rat. *J. Nutr.* **90**, 19–24.
- TAKAHASHI, T.; SAKAGUSHI, E. (1998): Behaviors and nutritional importance of coprophagy in captive adult and young nutrias (*Myocastor coypus*). *J. Comp. Physiol.* **168**, 281–288.
- VICKERS, W. T. (1991): Hunting yields and game composition over ten years in a Amazon indian territory. In: Neotropical Wildlife Use and Conservation. Ed. By J. G. ROBINSON and K. H. REDFORD. Chicago: Univ. Press. Pp. 53–81.
- WOODS, C. A. (1984): Hystricognath rodents. In: Orders and Families of Recent Mammals of the World. Ed. By S. ANDERSON and J. K. JONES JR. Canada: John Wiley. Pp. 389–445.

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