

A POSSIBLE FUNCTION FOR FEMALE ENURINATION IN THE MARA, *DOLICHOTIS* *PATAGONUM*

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1. INTRODUCTION

The mara (*Dolichotis patagonum*, Zimmerman, 1758) is a large (6 – 10kg) caviomorph rodent from the dry, scrub deserts of central and southern Argentina. In this socially monogamous species, scent marking appears to play an important role in the maintenance of the pair bond (Dubost and Genest, 1974, Taber and Macdonald, 1984). Sexually mature adult maras practise two forms of scent marking. Firstly, both sexes perform anal marking, whereby secretions from paired ano-genital scent glands are distributed by the action of pressing, dragging and rocking the anal area against the ground (Pankhurst, 1998). Secondly, both sexes also use enurination or urine spraying. Males enurinate by rearing up on their hind legs and spraying urine forwards from a bipedal stance. Females, and some juvenile males, enurinate by spraying urine backwards from a quadrupedal stance. The target of enurination is usually a conspecific. Taber and Macdonald (1984) suggest that female enurination could function to provide the male with a sample from which female reproductive status could be assessed, thereby advertising receptivity. This hypothesis generates the predictions that female enurination frequency will increase significantly during oestrus (0-8 hours post-partum, Dubost and Genest, 1974), and that the target will be the female's mate. As part of a wider, ongoing study, we aimed to test this hypothesis by determining the targets of female enurination and assessing the frequency of enurination in relation to female reproductive status.

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2. METHODS

The subjects of our study were 41 socially monogamous pairs of adult maras belonging to a free-ranging population at Whipsnade Wild Animal Park, U.K. To facilitate individual identification, we fitted every animal with a coloured ear tag printed with a unique number. During capture of the animals for tagging, each individual was sexed. Males were tagged in the right ear, females in the left ear. Focal animal follows were then used to determine the identity of established pairs as well as the reproductive status of each female within a pair. Enurination behaviour is relatively infrequent and of short duration, so all instances of enurination were recorded by one observer during focal follows, each lasting at least three hours. For each incidence of enurination, we recorded the date, time, female reproductive status and target of the urine spray. To record reproductive status, each female was assigned to one of five categories:

1. Non-reproductive (neither pregnant nor lactating).
2. Pregnant (obviously pregnant, with swollen belly).
3. Heavily pregnant (days immediately prior to parturition, belly extremely swollen).
4. 0-8 hours post-partum (in oestrus).
5. Lactating (seen suckling pups, teats distended/prominent).

As maras experience a post-partum oestrus, females may be simultaneously pregnant and lactating. For the purpose of this study, we scored females as pregnant only when they were known not to be lactating. It is possible, however, that a number of the females scored as lactating were also pregnant.

3. RESULTS

Females enurinated over their mates, strange males, and over both their own and strange pups (Table 1). We also observed females enurinating over other females, over free-ranging peafowl, and over small children who had approached the animals from the rear while the maras were feeding.

3.1 Female Enurination in the Mara

Enurination frequency did not differ significantly with female reproductive status (Kruskal-Wallis test, ns, $\chi^2 = 4.36$, $df = 4$, $p = 0.36$ (Figure 1)).

Table 1. Targets of female enurination, as a proportion of all observations (total number of episodes = 144; $n = 41$ females, all reproductive categories).

Target of female enurination	Male mate	Strange male(s)	Own pup(s)	Strange pup(s)	Other
Proportion of all episodes observed	0.33	0.34	0.10	0.19	0.04

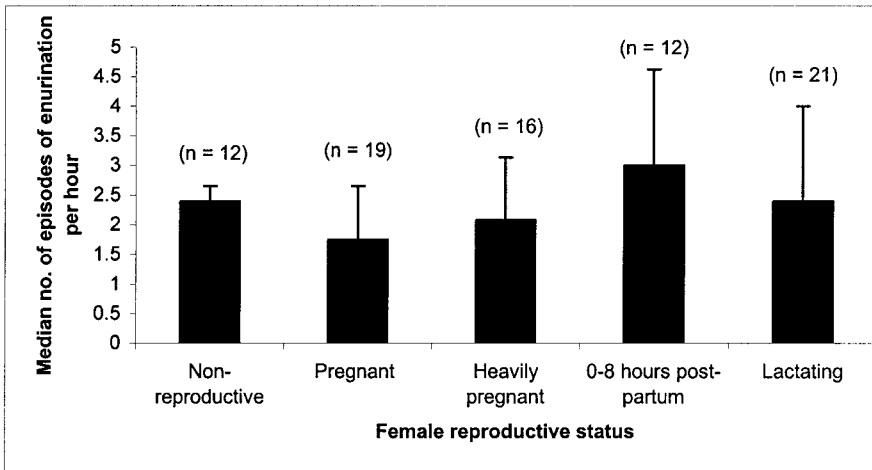


Figure 1. Median frequency of enurination per hour by female maras, in relation to female reproductive status. Bars show median values and vertical lines show inter-quartile ranges. Some females were sampled more than once, at different stages of their reproductive cycles. The sum of the sample sizes for each category ($n=80$) is therefore greater than the actual sample size ($n=41$).

4. DISCUSSION

The hypothesis that female maras use enurination to advertise receptivity was not supported by this study, as female enurination frequency did not differ significantly throughout the oestrus cycle. In addition, females sprayed any mara (and some other species, including humans) that approached too closely, although male maras, either the female's mate or a stranger, were the females' targets in 67 percent of all observed enurination incidences. Male maras often try to gain close proximity to females. An established pair will remain spatially and temporally close throughout the female's oestrus cycle, and males will threaten and chase off other males that try to approach their female (Pankhurst, 1998). This does not prevent strange males from attempting to gain access to a paired female. However if the newcomer succeeds, he can sometimes separate a female from her mate for several hours (Pankhurst, 1998). It is not surprising, therefore, that male maras are the target of female enurination in the majority of cases. The slight but insignificant increase in enurination frequency during oestrus may be similarly explained; it is during oestrus that female maras are likely to receive the highest number of possibly unwelcome approaches from males.

It could be argued that, since the majority of enurination targets are male maras, females do spray to advertise sexual receptivity. Maras are socially monogamous, but there is some genetic evidence to show that they do not always mate within their pair-bond (Pankhurst, 1998). The data showing that females target strange males as often as their established mates could be interpreted as an indication that females are receptive to

extra-pair copulations. Determining the context of female enurination – the events that precede it and the response from the targets – should increase clarification. We are currently working to obtain the necessary data and early results indicate that female enurination occurs in a variety of circumstances, often when maras are feeding in large groups at spatially concentrated supplementary food sources. Furthermore, enurination appears to result in decreased proximity between the target and the spraying female, rather than the reverse.

We suggest that enurination by female maras is used primarily as a deterrent behaviour, serving to repulse unwelcome advances, usually by males or pups. This is largely in agreement with Dubost & Genest (1974) who observed that enurination by female maras caused the recipient to draw back, and have suggested that female enurination actually serves to indicate a non-receptive state.

5. ACKNOWLEDGEMENTS

Grateful thanks to the Zoological Society of London and Whipsnade Wild Animal Park for their help and cooperation with this study.

6. REFERENCES

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