

Full Length Research Paper

# An evaluation of the courtship behaviour of the male agouti (*Dasyprocta leporina*) towards introduced females

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The objective of this study is to determine the courtship behaviour of male agoutis reared in an intensive production system. Six male and ten female agoutis were randomly selected and housed in individual cages. Six females together with the males were included in a 6 × 6 Latin Square Design experiment where the six females were introduced into the males' cages for 48 h periods once per week for six weeks. The other four females were kept as reserves. The initial union of the animals were observed for 20 min during which time the males' courtship behaviour were recorded. The vaginas of the females were swabbed for the Papanicolaou test before introduction and after the union period with the males to determine the stage of the estrous cycle and the presence of spermatozoa, respectively. The presence of spermatozoa was taken as an indication that mating had occurred and females testing positive were replaced. There was no significant relationship ( $P < 0.05$ ) between males that achieved an erection (72.22%) and the females' stage of estrous. Males also frequently urinated on females. It was concluded that the male agoutis' urolagnia may suggest possessive tendencies.

**Key words:** Male agouti, courtship behaviour, estrous, estrus, urination.

## INTRODUCTION

Enormous amounts of resources have been dedicated towards improving the productivity of animals domesticated in Europe and Asia, such as *Bos taurus*, *Sus scrofa* and *Gallus domesticus* (Mollineau et al., 2006). However, very little attention has been given to the edible indigenous species of the Neo-tropical. They include the agouti (*Dasyprocta leporina*), spectacled caiman (*Caiman sclerops*), cocrico (*Ortalis ruficauda*) which is one of the two national birds of the Republic of Trinidad and Tobago, red brocket deer (*Mazama americana*), iguana (*Iguana iguana*), lappe/spotted paca (*Agouti paca*), manicoú/black eared opossum (*Didelphis marsupialis insularis*), tattoo/nine banded armadillo (*Dasyurus novemcinctus*), and wild hog/quenk/collared peccary (*Tayassu tajacu*) (Garcia, 2004). These native wild animal species are of importance for conservation, utilization, cuisine, production and domestication.

In the twin island state of the Republic of Trinidad and

Tobago, located in the southern Caribbean, *D. leporina* is a favored meat at social events and the farming of this species has steadily increased over the past three decades (Mollineau et al., 2000). Two major factors have driven animal production since the catalyst was initiated for improving animal husbandry during the Roman Empire (27 B.C. - 395 A.D.). This was mainly due to improvements made in conscious animal breeding and nutrition during this period (Bokonyi, 1983). Courtship behaviour is an integral part of the mating and breeding in the animal kingdom. However, *D. leporina*, an edible rodent, unlike its domesticated meat producing counterparts, is presently considered semi-domesticated

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**Table 1.** Score allocated for levels of aggression by males after females were introduced into their cages.

Aggression level	Score
No signs of aggression	1
Threatening actions (stamping of hind legs, raised back hair)	2
Charges but does not attack	3
Attacks	4

**Table 2.** Score allocated for time lapse before males displayed any actions.

Time lapse (minutes)	Score
0 - 5	1
6 - 10	2
11 - 15	3
16 - 20	4

(Mollineau et al., 2010). Additionally, the male agoutis' reproductive system and sexual behaviours are documented in only a handful of publications (Garcia, 2004; Mollineau et al., 2006, 2009, 2012). There is growing interest in the use of agoutis as a commercial meat source (Assis-Neto et al., 2003; Brown-Uddenberg et al., 2003; Mollineau et al., 2006, 2009). Therefore, to exploit the commercial potential of this species, the reproductive parameters must be tacit and understood. Understanding the male agoutis' courtship behaviour is of critical importance to captive breeding efficiency in this species. The objective of this study therefore is to determine the courtship behaviour of male agoutis reared in an intensive production system.

## MATERIALS AND METHODS

### Criteria for selection of the agoutis

- 1) Animals were caged and reared at the Wildlife Unit in the University Field Station, UWI.
- 2) Males and females were proven sires and dams, respectively.
- 3) There was recorded proof of age (2 - 3 years).

### Experimental animals

Two weeks before the start of the experiment, male agoutis (n=6) were selected and transferred to individual dwelling cages of the following dimensions: width (46 cm), length (60 cm), and height (46 cm). Female agoutis (n=10) were also randomly selected and housed in similar conditions to the males. At the beginning of the experiment, male (n=6) and female (n=6) agoutis were included in a 6 × 6 Latin Square Design experiment in the

ratio of 1:1 (male:female), while the remaining 4 females were kept as reserves. Housing the animals in these cages allowed for easier handling of the agoutis and reduced the stresses experienced during restraint and movement. Throughout the experiments, the agoutis were fed *ad lib* with rabbit feed which contained 17% crude protein, 2.5% crude fat and 15% crude fibre (manufactured by Master Mix of Trinidad Limited, No. 11 Fernandez Compound, Eastern Main Road, Laventille, T&T), local fruits and/or vegetables and/or root crops. The agoutis were also provided clean, fresh water daily. This was to ensure that the diet was not limited in protein, energy, major minerals, vitamins and fibre. All animal rights were observed during this study.

Females were introduced into the males' individual cages once per week and left for a period of 48 h. The courtship behaviour of males towards the introduced females were observed and recorded while the stage of the estrous cycle of each female was determined by taking vaginal swabs for the Papanicolaou test (Pap smear) before introduction to the males and after a 48 h period with the males to determine the presence of spermatozoa in the vagina. The presence of spermatozoa was taken as an indication that mating occurred. Females that tested positive for spermatozoa were replaced.

Following introduction of females into the cages with individual males, the animals were observed for 20 min and the following behaviours were recorded with scores allocated as indicated hereunder:

- (i) The allocations of scores for the level of aggression displayed by the males towards the females and the time before aggressive actions occurred are listed in Tables 1 and 2, respectively.
- (ii) Scores allocated for the courtship behaviour of the males after females were introduced into their cages and the time lapse before any response occurred are listed in Tables 3 and 2, respectively.

### Statistical analysis

Statistical analysis included descriptive statistics and Logistic Linear Regression. The statistical software used was SPSS. It was observed that the significance level ( $\alpha$  level) was 0.05, while  $n = 36$ .

**Table 3.** Score allocated for courtship and mating behaviour by males after females were introduced into their cages.

Sexual responses	Score
Penile penetration	1
Male chases female with an erection, nibbles at female and urinates on female	2
Male chases female with an erection, nibbles at female or urinates on female	3
No reaction	4

## RESULTS

Following the introduction of females into the cages containing males, 72.22% of the males achieved erections. There was no significant relationship ( $P < 0.05$ ) between males that achieved an erection (72.22%) and the females' stage of the estrous cycle. A significant relationship ( $P < 0.05$ ) existed between males that achieved an erection (72.22%) and chasing the female around the cage. Approximately one third (30.76%) of the males that chased females around the cages also urinated on them and nibbled at their necks. More than half (57.69%) of the males that chased females sniffed their genitalia. However, there was significant differences between the males and their lapse in time before showing any reactions ( $P < 0.05$ ) towards females. After the union period, only 3% of the Papanicolaou tests were positive for spermatozoa.

## DISCUSSION

Erection is an indication of sexual arousal in male animals and the desire to mate (Hulla and Domingueza, 2007). Males are normally sexually aroused by the sight, smell and/or sound of estrus females (Harding and Feder, 1976). However, during this study, males were sexually aggressive towards the females and attempted to mate with them regardless of their stage of estrus. This could be an indication of the spirited libido of the male agoutis (Kustritz, 2005). Male rodents chasing non-oestrus females have also been reported in rats (Minerbo et al., 1994). Genital sniffing and licking which are common in both domesticated and wild species (Johnston and Rasmussen, 1984) were also reported as components of the courtship behaviour of the male agoutis.

Urination is reported to play an important role in rats when female are selecting mates in addition to hastening the timing of mating and enhancing oestrus behaviour (Taylor et al., 1983; Miquelle, 1991; Rekwot et al., 2001). Hence, some physiological phenomenon may exist between the potency of the male agoutis' urine and the females' approval of the individual males. Urine is also used to symbolize possession in some species, although this is usually an indication of territorial dominance (Zub et al., 2003). Nevertheless, the male agoutis' urolagnia

may be an act of claiming temporary ownership of females for mating as agoutis were observed to be polygamous in captivity (Aliaga-Rossela et al., 2008).

The males' hesitation before showing any sexual aggressive reactions varied among individual males and may contribute part of the courtship behaviour. Male reactions and the absence of spermatozoa in the females' reproductive tracts after the period of union may indicate that the agoutis' courtship period is longer than 48 h. Species may have varying courtship periods such as that reported in rodents (Zenuto et al., 2001), African buffalos (Turner et al., 2005) and primates (Cavigellia and Pereirab, 2000). However, more research is necessary to ascertain the mean duration of the agoutis' courtship period. This would be a significant contribution to increasing their captive numbers and further enhancing their domestication process.

## Conclusion

The male agoutis make sexual advances regardless of the females' stage of oestrous cycle and urolagnia may be executed with possessive intentions.

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