



Department of Studies in Psychology

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Ph.D. Thesis Evaluation Report

Researcher: Filip Jaromir Wojciechowski

Thesis title: The Philippine Tarsier (*Tarsius [Carlito] syrichta*): Activity Patterns, Social Behaviour and Population Endangerment Risk in Bilar, Bohol

Adam Mickiewicz University

Background

Behavioural Biology and Conservation Biology have generally remained unconnected disciplines. Most people studying animal behaviour, even in the natural habitat of a species, focusing on individuals or social groups, rarely discuss the conservation management implications of their research. Conservation biologists, usually looking at ecosystems, landscapes, genetic diversity, biotic/abiotic factors, community involvement etc. concerning conservation, especially of endangered species, pay scanty attention to the behaviour of animals they attempt to conserve. It is only in recent years that the implication of animal behaviour research for management of a species has been realized. The researcher of this thesis has taken a small, but significant, step in this direction where he studies behaviour of a threatened primate the result of which could be useful in *ex situ* management, and also carried out a community survey the data from which may help *in situ* conservation.

Justification

Research in primatology has made tremendous advances during the past 50 years or so, yet not much is known about primate species that are nocturnal, largely solitary, and inhabit forests and terrains that are not easy to access. The research reported in this thesis is on the Philippine

tarsier, a species endemic to a few islands in Philippines. Because of the nature of the terrain of its distributional range, it is quite difficult to study in its natural habitats. Therefore, not much is known about its abundance, ecology and behaviour. The present research, though carried out on captive animals, makes it a significant beginning of work on the behaviour and management of the Philippine tarsier.

Thesis organization and structure

The thesis comprises three major chapters based on three published articles: Activity patterns, social interactions, and awareness in the local community about conservation issues concerning the Philippine tarsier. Whereas several research studies have been carried out on the other tarsier species in the Sulawesi, and Borneo and Sumatra regions, only a few and very preliminary data, are available on the Philippine tarsier. The behavioural research reported in this thesis was carried out on two subjects, a male and a female, maintained at the Subayon Conservation Centre in Bilar, Bohol. Both subjects were wild caught. Both animals were mainly kept in separate enclosures, and were paired only for about 3 weeks each time in 2015 and 2016 in the months of October-November which is the mating season for this species. The behavioural observations included recording the activities of the animals while in solitary confinement; on male for 36 days before, and on female for 21 days after, the pairing in 2015 during which period, the social interactions data was collected. Social behaviour was also observed for 20 days in the second mating season in 2016. The community survey data were collected in 2016-2017.

Main body of the thesis

Activity patterns

In any study on animal behaviour where not much is known about a species, the first focus is always on preparing an ethogram and then recording the allocation of time by an animal to different activities as such allocations are adaptive in nature. Though captivity does alter behaviour of a wild animal, many patterns resemble those in the wild. Nonetheless, the activity budget data on captive animals can be very useful in developing management strategies under human care. The present study focused on the activity patterns of the male and the female Philippine tarsier when solitary and when paired, and variations over hours during the nocturnal waking time. These activities are compared with those of the eastern and the western species of tarsiers. The housing for the animals was made as natural as possible. Using Instantaneous Scan

Sampling with 1-min intervals, data were collected on activities that included Resting, Scanning, Travelling, Foraging, Feeding, Scent-marking, Self-grooming, Others (rare activities) and Social interactions. There was no sex difference for activities under solitary conditions. When paired, male foraged, scent-marked and socially interacted more than the female and self-groomed and rested lesser. Upon pairing, the female activity budgets did not change while the male spent lesser time on resting, scanning and Self-groom and more on travel and forage than when solitary. When both sexes treated together, in the mating season, the time spent on resting, scanning and self-groom decreased while it increased on travel and forage as compared to the non-mating season. Under solitary condition, Scanning increased during the last two quarters while Resting increased in the second quarter in both sexes. Under pairing condition, the male was active throughout the night. The male travelled more during the last quarter and foraged more during the first and second quarters. Towards the last quarter, Scanning and Travelling increased in both sexes with a drop in foraging. Overall, the fluctuations in activities were more in both sexes during the mating season than when solitary. Although generally, the sexually dimorphic species show considerable differences in activities between males and females, the results of the present study, and of several others, show that it is not necessarily always the case. Increased travelling by the males during the mating season is observed in most other primate species also as the males search for sexually receptive females. Regurgitation and re-ingestion were the novel and unique behaviours observed in the tarsier. Since no data are available on activity patterns on the Philippine tarsier, the same were compared with other tarsier species. *T. syrichta* was similar to *T. spectrum* for Scan, Forage and Feed combined and to *T. diana* for Resting. From these comparisons, it does not appear that *T. syrichta* has a greater activity pattern similarity to *T. banacanus* than to *T. spectrum* and *T. diana*.

Social behaviour

While there have been some preliminary studies on positional behaviour and social organization, mother-infant interaction and infant development, vocalizations, home ranges and predation, there are no data available on social behaviour in the Philippine tarsier. The present study reports social interactions between a male and a female in two mating seasons of 2015 and 2016. The data were collected on Affinitive, Agonistic and Sexual behaviour, as well as on proximity with four distance categories. The time spent on social interactions was only about 4%. During the first mating season, sexual interaction was more than in the second mating season. Male initiated

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social interactions more than the female. Interestingly all sexual interactions were initiated by the male whereas female showed significantly more agonistic interactions especially when the male attempted sniffing and mounting. Most sexual interactions occurred upto the 9th night and female agonistic behaviour peaked in the 10th night. Two copulations were observed in 2015 which occurred during the early hours after the onset of activity. Sexual interactions significantly decreased after the copulations. Tarsiers spent most time in >2-7 m (longest) distance category and least in the 0 m (physical contact) category. Sleeping together and apart was for almost equal number of days during the first season, and more apart during the second. Male vocalized more, especially in the first season, than the female. Male vocalizations had no context while female vocalized more during agonistic interactions. Tarsiers spending very little time on social interactions is not surprising for a largely solitary species. High sexual interest by the male in the female during the first season is interpreted as meeting an unfamiliar individual, especially in the mating season. Most of the affiliative interaction was allogrooming which in any case is a characteristic pattern in most primate species. Agonistic behaviour may also be a consequence of living in the limited captive space which is observed in several other animal species. Several traits related to sexual behaviour and reproduction observed in the Philippine tarsier are also observed in other tarsier species.

Community knowledge survey

To develop effective conservation management policies, it is always necessary to assess the knowledge about the species of concern among the local population, and the attitudes of the local community towards conservation of the species. The researcher here interviewed 325 residents from five villages inside and outside the reserve forest areas, as well as with different professional backgrounds such as 'resource suppliers' (hunters, honey suppliers, etc) and 'others'. From the photos, the Philippine tarsier was recognized by 98% of the respondents. Resource suppliers, residents from forest villages, and males answered more in affirmative than others, residents from non-forest villages, and females respectively. Similar pattern of knowledge was observed regarding the diet of the tarsier. Most people opined that the tarsier was useful for economic, aesthetic and ecological reasons. Hunting and trapping for trade appeared to be quite common. However, the correct knowledge about the species distribution, ecology, diet, threats, and conservation status was not very widespread.

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Implications

The data gathered during this research project could be quite useful for the management of the Philippine tarsier in captivity and in the wild habitats. The activity patterns reported here not only provide clues to what it must be like in the wild population, but is also helpful in designing housing for the captive tarsiers. The separation of the female after mating helped avoid aggression and stress during pregnancy, resulting in successful breeding. However, this recommendation should be made with a bit of a caution as, in the wild, the new infants often interact with their previous year siblings, and also occasionally with other conspecifics in the area in many largely solitary or semi gregarious prosimian species. A total separation may deprive the infant of occasional but nonetheless useful interactions necessary for a proper socio-sexual development. The data from the survey study reveals why people with certain backgrounds and with better knowledge about the species should be actively involved in the *in situ* conservation management activities.

Limitations but way forward

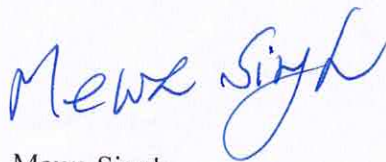
This research has several limitations. The obvious ones are the small sample size, only few days observations under each condition, and non-availability of data on individual differences and idiosyncrasies. However, this preliminary study also provides a base to launch further studies that could focus on a. Increased sample size, b. Recording behaviour throughout the year so that seasonal variations, if any, could be observed, c. Allowing access among animals even during the non-mating season as in their natural environments, d. Releasing prey in small quantities with intervals to see if feeding (which was maximum in this study immediately after waking) becomes a more or less continuous activity as insectivorous species in nature would find their prey distributed in space and time, and e. Extending the long-term behavioural research to the wild population, using radio telemetry, if permitted by the authorities as it was done in an earlier study on infant ontogeny.

Recommendation

Overall, the present research with three independent but interrelated studies was well conceived with clear objectives and specific aims. The required data were collected using standard sampling methods, and rigorously treated with appropriate statistical tools. The results were properly discussed with reference to the related literature. All three articles are published in

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peer-reviewed and well respected journals. I therefore recommend that the thesis titled "The Philippine Tarsier (*Tarsius [Carlito] syrichta*): Activity Patterns, Social Behaviour and Population Endangerment Risk in Bilar, Bohol" submitted by Filip Jaromir Wojciechowski be accepted and the candidate be admitted to the degree of Doctor of Philosophy.



Mewa Singh

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