BEHAVIOUR OF THE MISHMI TAKIN (*BUDORCAS TAXICOLOR TAXICOLOR*) IN EAZA ZOOS

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INTRODUCTION

Mishmi takin (*Budorcas taxicolor taxicolor*) is a little studied endemic goat-antelope subspecies which inhabits isolated Himalaya's territories. As all subspecies of takin, Mishmi takins has larger extinction risk and one of the biggest obstacles to its conse rvation is the lack of knowledge about animal ecology and behavior (Li et al., 2020). Considering the difficulty of studying wild animal, captive takins can represent a good opportunity for obtaining new information for future conservation strategies for the species, especially with the support of multiple institutions and Takin EEP.

The aim of the study is to characterize the behavior of Mishmi takin living in zoos, taking into account the influence of various factors. To achieve this goal several tasks were set: to determine the time budgets of Mishmi takin behavior in zoos and compare it with related takin subspecies, characterize the behavior of Mishmi takin depending on weather and the presence of animal keeper, clarify the behavior of Mishmi takin on different day time and to compare the differences in the behavior of Mishmi takin between different ages and genders. The study has been presented as a bachelor thesis in biology at the University of Latvia.

METHODS

We investigated the behavior of 20 individuals of different age and sex in five European Zoo (direct observations/video study) (Table 1). Observations were based on a previously developed ethogram. The obtained video materials were analyzed in the same way as face-to-face observations, using the scan sampling method for systematic observations (Altmann, 1974). Total of 46,5 hours of systematic observations were used to characterize the behavior of captive Mishmi takin. At specific times of the day (10:00 - 11:00; 12:00 - 13:00; 14:00 - 15:00), 10-minute observations were made four times, in which the activities of all individuals were recorded every minute. The method was replicated. The obtained data were transformed into time units and expressed as a percentage. In the data processing, the time budgets was visualized, DCA ordinations and correlation analysis were performed as well as regression models.

Place of study	Number of animals	Type of observations	Duration of observations	Period of observations
Riga Zoo, Latvia	6	Present observations	30	September-March
Madrid Zoo, Spain	2	Video recording	2	February
Ähtäri Zoo, Finland	2	Video recording	10	February
Munich Zoo (Hellabrunn), Germany	7	Video recording	2	February
Košices Zoo, Slovakia	3	Video recording	2,5	March

Table 1. Zoos involved in the study, type and duration of observations.

RESULTS AND DISCUSSION

Most of the day time Mishmi takin behavior consists of feeding and resting. Movements, aggressive behavior, body care and exploratory behavior were observed less. The rest of the behavior constitutes a tiny part of time budgets (Figure 1).

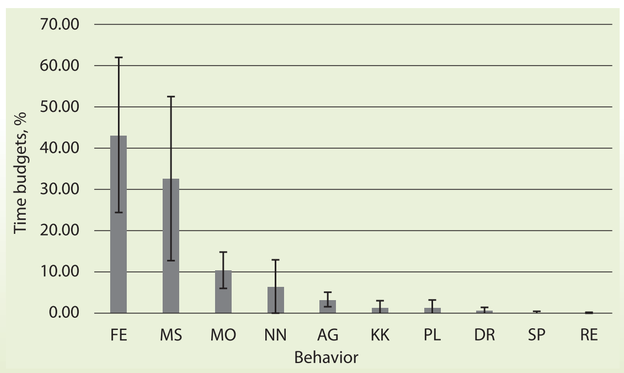

Figure 1. Time budgets of captive Mishmi takin (FE-feeding; MS-resting; MO-moving; NN-observation disturbance; AG-aggressive behavior; KK-maintenance; PL-exploratory behavior; DR-friendly social behavior; SP-play behavior; RE-reproductive behavior).

It is important to note that among the zoos clustering was observed. This is explained by the fact that zoos have different keeping conditions and it can be seen that feeding and rest habits of animals are also different (Figure 2).

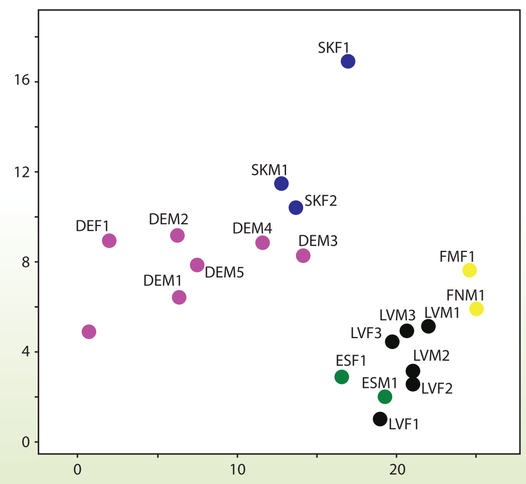

Figure 2. Behavioral grouping of Mishmi takin in European Zoos (Riga Zoo-black; Madrid Zoo-green; Ähtäri Zoo-yellow; Munich Zoo-pink; Košice Zoo-blue).

Cold and cloudy weather (Figure 3) increases the feeding time; however, the proportion of time spent sleeping is decreasing. These changes are self-explanatory with animal comfort. In cold weather, animals have extra need for energy to maintain the body temperature, but in warm weather they maintain their body heat while sleeping in places with damp and cool soil.

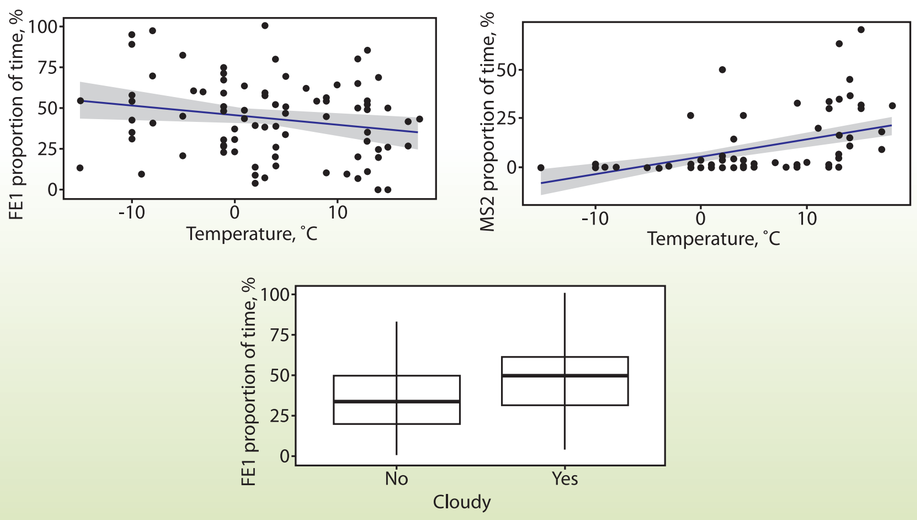

Figure 3. Weather effects on the behavior of the Mishmi takin.

The results show that in the presence of zookeeper feeding time and friendly social behavior decreases but movements and aggressive social behavior increases (Figure 4).

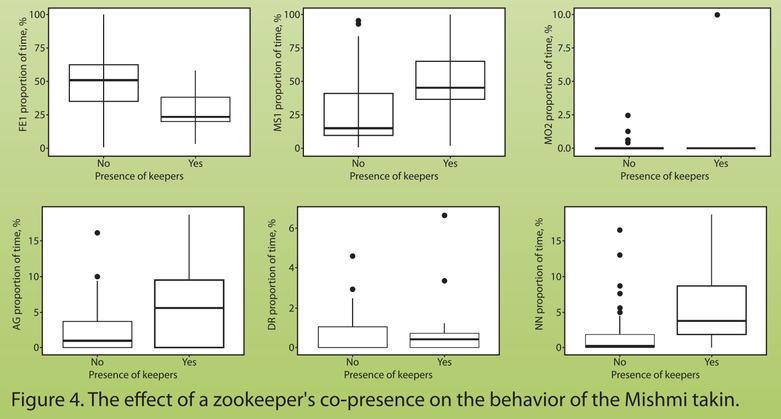

Figure 4. The effect of a zookeeper's co-presence on the behavior of the Mishmi takin.

Mishmi takin males were feeding more, but females ruminated more. This is related to physiological processes as well as hierarchy. Play behavior was more observed in young individuals, as this behavior is directly related to the juvenile period of the animal. Similarly, exploratory behavior is more observed in younger individuals - they are more secure, more curious (Figure 5).

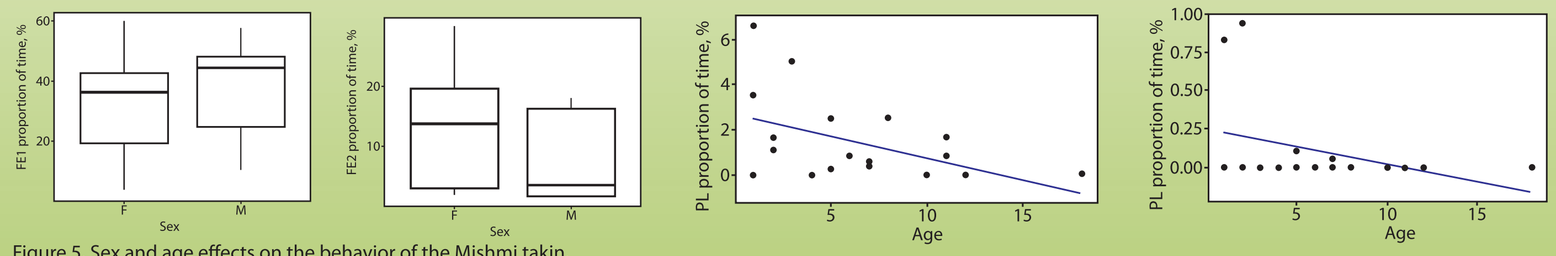

Figure 5. Sex and age effects on the behavior of the Mishmi takin.

CONCLUSIONS

- Mishmi takin's activity is consistent with the pattern of behavior observed for all Bovidae, the behavior is dominated by the state of feeding and rest.
- Equivalent proportion of movements and other behaviours both in the wild and zoo can be considered an indicator of the good adaptation of the studied animals to captivity.

Thanks for the collaboration:

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