

GROWTH RATE AND PELAGE COLOUR CHANGES OF A CAPTIVE BRED MALAYAN TAPIR (*Tapirus indicus*)

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ABSTRACT. Studies of ontogenetic changes in Malayan tapir are scarce. In this study, the growth pattern and pelage colour changes of a female calf born at the Wildlife Conservation Centre in Sungai Dusun, Selangor was monitored for a period of nine months. The body weight, chest girth, shoulder height and body length was recorded every two weeks. Coat colour of the calf was examined photographically every two weeks until the calf lost the juvenile pattern. The black and white spotted coat turned into adult colour pattern at the age of 15 weeks. Results showed a correlation between the body weight, chest girth, shoulder height, and body length.

Keywords: Malayan tapir, *Tapirus indicus*, calf, growth, colour changes

INTRODUCTION

The Malayan tapir (*Tapirus indicus*) is the largest of four species in the family of Tapiridae and the only species that is found in Southeast Asia. The remaining three species, Baird's tapir (*T. bairdii*), lowland tapir (*T. terrestris*) and mountain tapir (*T. pinchaque*), are found in Latin America. The Malayan tapir is currently listed as endangered on the IUCN Red List (Traeholt

et al. 2016). It has a large body, ranging from 250 kg to 540 kg with a length of 0.9 m to 1.1 m (Gearty, 2012). The females are often larger than the males by 25 kg to 100 kg (Gearty, 2012). The adults are identified by its black and white colour pattern; black front half of the body and hind legs, white dorsal and lateral part of the thorax and abdomen, and a white fur rim on the tip of the ears. The calves have a dark brown fur with white stripes and spots, which gradually fade by six months of age (Barongi, 1993).

Since 2004, Sungai Dusun Wildlife Conservation Centre (SDWCC) in Malaysia has successfully bred Malayan tapir (DWNP, 2005). To date, fourteen births have taken place, including a twin birth in 2007 (Zainal Zahari, 2014; Traeholt, 2007). Apart from SDWCC, tapir breeding is also taking place in several local zoos throughout the country which include the National Zoo, Taiping Zoo at the north and Melaka Zoo at the southern part of Peninsular Malaysia. To date, Adachi's study of pelage change of a Malayan tapir calf in Chiba Zoological Park (Adachi, 2004) is the only one conducted about the ontogenetic colour changes of Malayan tapir. This study was conducted to document the pelage colour changes and growth rate of a Malayan tapir calf at SDWCC.

MATERIALS AND METHODS

Study subject

A female Malayan tapir calf was born in SDWCC and was selected as the subject of this study. Besides milk from the dam, the calf was given leaves, fruits and horse pellets. Water was provided daily through a nipple drinker system. The calf and dam (Figure 1) were kept together in a 4.8 m × 3.5 m night stall with free access to a 350 m² exercise yard. The bull was separated from the cow until the calf was weaned at the age of 8 months.

Measurements and Data Collection

The calf's body weight (BW), chest girth (CG), shoulder height (SH) and body length (BL) were recorded every two weeks for a period of nine months. These measurements began when the calf was two weeks old. CG, SH and BL was measured with a measuring tape. CG was measured around the chest, just caudal to the forelimb, while the tapir was in a relaxed condition (exhaled). SH was measured from the ground up to the highest point of scapula while the tapir was in a standing position and BL was measured from the dorsal part of the head (external occipital protuberance) to the base of its tail (last sacral bone). All measurements were made



Figure 1. An adult tapir and her calf

in centimetres, accurate to 1 mm. The calf was weighed on a flat platform and body weight recorded with an electronic weighing scale accurate to 0.1 kg (EziWeight6, Tru-Test Limited, New Zealand). Nikon models D90 and D300s cameras were used to photograph the calf during daytime every two weeks until the body coat changed into the adult black and white pattern.

RESULTS

Coat colour and pattern

Based on weekly observations, the calf's coat colour and pattern turned into the adult colour at the age of 15 weeks. At the age of seven weeks, the coat pattern started to fade away from the dorsal part of the rump, followed by the abdomen. Subsequently, at 10 weeks, the colour change was more intense and at 15 weeks the coat colour and pattern completely turned into the adult pelage (Figure 2).

Body Morphology

Table 1 showed that the average daily gain in body weight (ADG) of the calf during the first six months was 0.62 kg/day which subsequently reduced to 0.54 kg/day in the following three months. Therefore, the overall ADG was 0.59 kg/day. The average daily increment (ADI) of CG, SH and BL was high during the first 3 months (0.36 cm, 0.21 cm and 0.41 cm) compared to the following three months (0.29 cm, 0.18 and 0.27 cm). During the 7th to 9th month, the ADI was further reduced to 0.08, 0.11 and 0.14 cm, respectively.

At one week old, the calf weighed 11.2 kg, which was only 3.8% of the dam's body weight (290 kg) (Figure 3). The calf doubled its body weight to 21.2 kg within two weeks and 45.7 kg during the next three weeks. At 34 weeks, the calf reached 146 kg which is about half of the dam's body weight (292 kg). The CG of the calf at week two was 66 cm, increasing steadily but started to slow down at week 22 onwards. At week 36, the CG doubled to 130 cm. Meanwhile, the calf's SH and BL when two weeks old was 42 cm and 71 cm, respectively. Its SH doubled to 84 cm at 34 weeks while its BL doubled to 140 cm at 30 weeks.

Table 1. The calf's average daily gain and average daily increment.

Age	Average Daily Gain (kg)	Average daily increment (cm)		
		CG	SH	BL
Born - 3 months	0.62	0.36	0.21	0.41
4 months - 6 months	0.62	0.29	0.18	0.29
7 months - 9 months	0.54	0.08	0.11	0.14
Overall average	0.59	0.24	0.17	0.28



Figure 2. Color changes of Malayan tapir calf, Hawa from the day of birth until day 105. **A** – Day of birth; **B** – Day 14; **C** – Day 21; **D** – Day 35; **E** – Day 42; **F** – Day 49; **G** – Day 70; **H** – Day 83; **I** – Day 90; **J** – Day 105.

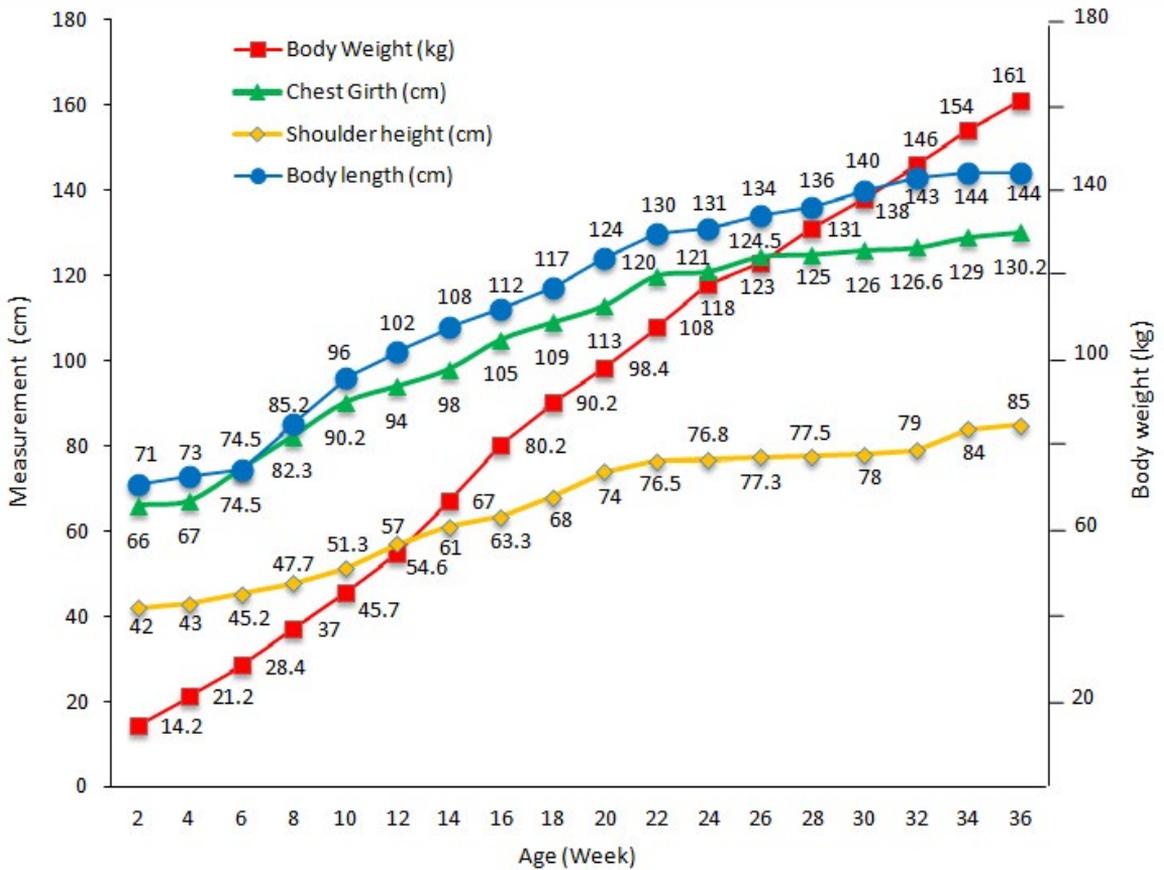


Figure 3. Growth curves of the calf’s body weight, chest girth, shoulder height and body length.

DISCUSSIONS

Coat colour and pattern

The changes in coat colour and pattern is similar to previous findings (Adachi, 2004). However, the change to adult coloration may vary in individuals. According to Barongi (1993), the calf stripes and spots will gradually fade by 6 months of age. While at

SDWCC, it took less than four months for a calf to attain adult coloration. Besides that, it was observed that a rescued male wild tapir calf fed with fresh ultra-heat treated (UHT) low fat milk (Dutch Lady) took almost 6 months to attain adult coat. Variation in diet, environment, health and perhaps genetic factors might have contributed to this different length of time.

Body Morphology

Due to the protective behaviour of the dam, the body weight of the calf could only be recorded a week after birth while the CG, SH and BL were measured at two weeks old. Although birth weight was not recorded, based on previous records, it was estimated between 6 kg to 10 kg. Its body weight doubled within 3 weeks and this is similar to the report by Barongi (1986).

The calf's ADG at 0.59 kg/day was slightly lower than that of a male calf born at the Conservation Breeding Centre of Malayan Tapir in Songkhla Zoo (birth weight of 6.9 kg) at 0.7 kg/day (Suwanna and Chonlawatana, 2007). The difference could be due to various factors such as sex, quality of the dam's milk and quality of feed given to the dam and calf. The calf's ADG, ADI and body morphological measurements (CG, SH and BL) were significantly high during the first three months, indicating a high growth rate during this period. The rapid growth at this stage might be due to the eating behaviour of the calf. It was observed that the calf started to eat jackfruit leaves (*Artocarpus heterophyllus*) and commercial horse pellets at the age of one month. The calf was also nibbling on leaves as early as one week old. The rich nutrients from the early dam's milk and the commercial horse pellets might have improved the growth rate of the calf. The dam's milk was analysed at the Dairy Laboratory, Jabatan Sains Haiwan, Faculty of Agriculture, Universiti Putra Malaysia using Milkoscan. The milk contained lower protein and fat composition (3.68% and 0.07%, respectively) at day 117 of lactation compared to day 17 (5.13% and 1.74%) of

another individual (Zainal-Zahari, *pers. Comm.*). Both ADG and ADI were reduced during the 7th to 9th month, while the body's morphological measurements started to slow down at week 22. This indicates the calf's decelerating growth. However, the growth is expected to continue until the calf reaches the adult height of 0.9 m to 1.1 m and length of 1.8 m to 2.5 m. (Gearty, 2012; Huffman, 2004). The reduction in ADG and ADI could be related to the feeding behaviour and activities of the calf. At the age of six months the calf was observed to be less dependent to the dam's milk and ate more leaves. The calf's average suckling time was reduced from approximately 10-12 times per day during the first months to 2-4 times per day (Pukazhenthil *et al.* 2013). Weaning at this age could also contribute to the reduction on both ADG and ADI. Figure 3 shows that the body weight and CG increases in tandem with the increase in the calf's body mass. Therefore, based on this result, the age of an orphaned calf and any of its morphological measurements could be estimated from a plot of known morphological values.

CONCLUSION

The study provided morphological information on the growth pattern of a young Malayan tapir. It also provides a system for determining the age of Malayan tapir calves based on morphometrics. This would certainly be useful for orphaned tapir calves from the wild and zoos. The system would also provide a means of assessing the normal growth of tapir calves that are hand-reared in captivity. However, to better

correlate the growth parameters, more individuals need to be studied at various conservation centres within the country. A correlation should also be carried out with respect to the different nutritional regimes offered at the various centres. The growth of the calf was still continuing at the end of the study and this will continue until the calf reaches maturity at two to four years. Therefore the study should be extended until the graph shows stagnant growth.

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