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The Age Structure of Tapirs (*Tapirus terrestris*) in the Chaco

By Leonardo Maffei

Introduction

The lowland tapir (*Tapirus terrestris*) is one of the most important sources of meat in the Bolivian Chaco. For example, it provides 14.3% of the wild meat harvested by indigenous hunters in the area (Noss 1998). Interviews with local people indicate that hunters must travel increasing distances from communities in order to hunt this species. This suggests that the species is over hunted and that management measures may be required to ensure that its hunting be sustainable. To confirm interview evidence we collected additional biological information to evaluate the status of the tapir population, namely the proportion of juveniles and adults. There are different ways to estimate the age of an animal, including changes in the coat colour or size of the animal to differentiate between young, juveniles or sub adults and adults. More accurate age estimates can be achieved applying more sophisticated techniques such as the analysis of dental wear (Dimmyck & Pelton 1996). This article describes the process for estimating the age of tapirs from dental wear, assigning age classes based on dental annuli analysis conducted in a laboratory.

Study area

The sampling area is covered by Chaco alluvial plain forest, with an annual precipitation of 500 mm and an average temperature of 26 °C (Navarro & Fuentes 1999). The Chaco forest is a dry tropical forest with a canopy of 4 to 6 m, numerous species of Cactaceae, and a dry season that lasts for 6 to 8 months. Twenty-four indigenous communities are distributed along the Parapetí river, including roughly 10,000 Isoseño inhabitants who depend, in part, on hunting for their subsistence needs.

Methods

As a part of a hunting monitoring program between 1997 and 1999, hunters of the Isoso area (Gran Chaco) collected the skulls of 40 tapirs hunted for subsistence purposes. It is assumed that young and old animals have the same probability of being hunted. As hunters hunt with dogs, the dogs do not discriminate between young and adults. For example, capturing tapirs using dogs as the Isoseño do in Cerro Cortado Investigation Camp (a area near Isoso where there is no hunting pressure) one juvenile and four adults were captured. This indicates that all animals have the same probability of being captured (Noss *et al.* 2003).

In order to determine the age of each animal, incisors were taken from the skulls and the roots were decalcified with 30% formic acid, then analysed in a laboratory by counting the dental annuli in the cementum of the root (the procedure is described in Maffei & Becerra (2001). Given the seasonality of precipitation and resource availability in the Chaco, with a single long dry season, it is assumed that each ring represents a year. In addition, based on dental wear, and relating this feature with the age obtained by counting the annuli, a key was developed to identify age classes (Appendix 1). Between 1999 and 2001, 27 new skulls were added to this study. The first 40 were aged according to the results of the annuli count, and the 27 new ones were aged using the key of dental wear detailed in Appendix 1.

Results and Discussion

Annuli could be seen in all samples, most of them showing clearly the age annuli, but several were so diffuse that they did not reflect the real age of the tapirs. In some cases the root of the tooth was so thick that it took between one week and 10 days to decalcify, and the annuli may have been lost in this long process. Analysis of the 67 samples shows that juveniles (ages between 0 and 1 year old) represent 63% of the hunted population (Fig. 1), and accordingly are being over-hunted.

Tapirs reach reproductive maturity at two years of age (Parera 2002). Padilla and Dowler (1994) reported first conception between 23 and 27 months, and gestation lasts for one year. Based on these figures, less than 72% of the live-born individuals die before reproducing in the Isoso tapir population. This means that only 28% of individuals can be considered as reproductively active. At two years old, the curve of age structures falls and stays stable. A further indication that the population is being over hunted is that the oldest reported individual from the Isoso was 12 years, against 30 years reported from captivity (Parera 2002).

The population structure of an over hunted population is similar to that observed with brocket deer (*Mazama gouazoubira), (*Maffei 2001), which is also a solitary species, where the only groups found are a female with her offspring. Tapirs are suffering intense hunting pressure in Isoso. Noss (2000), using different data applied to a sustainability model also reported that in the hunting area, the population of tapirs and white-
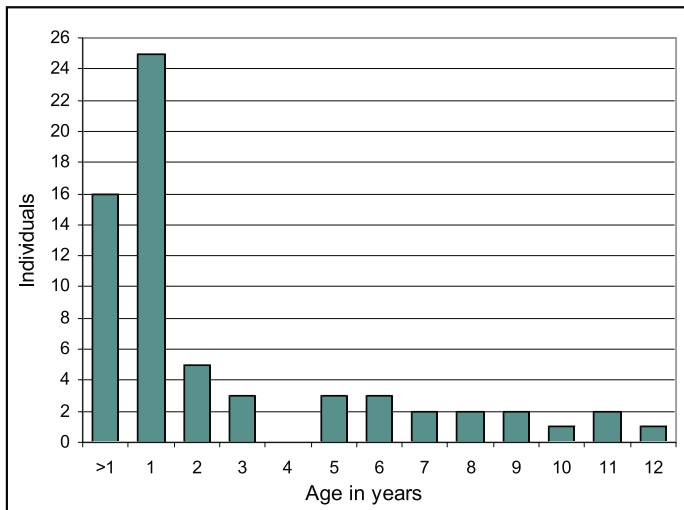
Fig. 1. Age structure of tapirs (Tapirus terrestris) from 1997 to 2000 in Isoso (n=67).

lipped peccaries (*Tayassu peccary*) are over hunted. The fact that less than 30% of tapirs reproduce at least once is a warning that the situation for tapirs in Isoso is critical. If this species is to survive in the Isoso indigenous territory, hunting should be controlled, for example by instituting no-hunting zones, a temporary ban on tapir hunting, and/or a ban on hunting young tapirs.

Acknowledgments

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Appendix 1

Key to determining tapir age (*Tapirus terrestris*) according to dental wear. **Note:** This key applies to the right inferior mandible, for dry forest tapirs. A skull where the last molar has not yet erupted is from an individual less than two years old.

2 years: All teeth have completely erupted, the first molar has the points slightly worn.

4 years: The crowns of all the teeth are slightly worn except for the last molar.

6 years: The first molar is very worn and concave, the first and second premolars are almost worn smooth. The last molar may or may not show wear.

8 years: The first and second molars are concave. The crown of the last molar shows wear.

12 years or more: Almost all the teeth are concave. The last molar shows variable wear.