Supports Utilization of Tarsius tarsler Erxleben 1777 and Tarsius bancanus Horsfield 1821 in Captivity and Classification of Taisiers based on the Tail Tuft = Posisi Pergerakan Tarsius Tarsier Erleben 1777 dan Tarsius Bancanus Horsfield 1821 di dalam Penangkaran dan Pengelompokan Tarsius berdasarkan Jumbai Ekor

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Abstrak

This study concerns the conservation of Indonesian tarsiers, specifically the interface between field and captive studies. There are two problems that are central to field and captive conservation studies, behavior and taxonomy. In this thesis I address to two research questions:

1. Do Indonesian tarsiers have differences in locomotor behavior that warrant different cage designs?
2. Can tarsier taxa, many of which have been identified with expensive and labor intensive techniques including DNA and acoustic analysis, also be identified by a simple, low-cost technique involving the morphology of the tail tuft?

There are three species groups of tarsiers, Philippine Tarsiers, Western Tarsiers, and Eastern Tarsiers. Hill (1955) classified these as Tarsius syrichta, Tarsius bancanus, and Tarsius spectrum, respectively, but Brandon-Jones et al. (2004) revised Tarsius spectrum to include five distinct species: Tarsius tarsier (= Tarsius spectrum), Tarsius sangirensis, Tarsius pumilus, Tarsius pelengensis, and Tarsius dianae (probably a junior synonym of dentatus). Of these, two species groups are endemic to Indonesia, Western and Eastern Tarsiers. Hill (1955) indicates that these two species groups can be distinguished by their tail tufts (see figure II-5), the tuft of Western Tarsiers being less extensive than that of Eastern Tarsiers. These two species groups also have clear-cut social differences (Sussman 1999), and Niemitz (1979) hypothesized locomotor differences based on the limb anatomy.

I studied one male-female pair each of Tarsius bancanus and Tarsius tarsier in side-by-side cages at Captivity of Mammals Centre of Biological Research, Indonesian Institute of Sciences, Cibinong Bogor, over a three-month study,

I collected 546 hours of observation on Tarsius bancanus and 574 hours on Tarsius tarsier. Results from this study show statistically significant differences in locomotor behavior that support Niemitiz’s hypothesis, and which imply that Western and Eastern Tarsiers require different cage designs. In a second study of tail tuft morphology, I collected 13 measurements on the tail and tail tuft of 23 Western Tarsiers and 20 Eastern Tarsiers in the collection of the Museum Zoologicum Bogoriense. My results demonstrate that Western and Eastern Tarsiers can be easily and confidently classified by using a multivariate discriminant function analysis of the tail tuft.

The results of these two studies show clearly that Western and Eastern Tarsiers can be identified by a multivariate analysis of the tail tuft morphology, and that these two species groups have significant differences in locomotor behavior, but the greater significance of this study lies in the implications for cryptic species within species groups. Results from the discriminant function analysis indicate three populations of Eastern Tarsiers, those from Sulawesi, Sangihe, and Peleng Islands, can be confidently identified by multivariate analysis of tail tuft morphology, a result that Hill (1955) did not arrive at.

Brandon-Jones et al. (2004) identified 16 populations of Eastern Tarsiers that might be taxonomically separable and warrant further studies. Thus, future studies should use this method to see if it is applicable to all of the populations identified by Brandon-Jones et al. (2004), not merely the three populations that I had access to. At present there are no hypotheses of significant locomotor differences within species groups. Further research is also needed to find out whether or not there are any differences of locomotor behavior among population of tarsiers, particularly those that had been identified by Brandon-Jones et al. (2004).

All living tarsiers are small, nocturnal, vertical clinging and leaping, faunivorous animal and ecological distinctive with regard to other primate (Sussman 1999). About 90% of their food consist of Arthropoda such as crickets, grasshoppers, cockroaches, beetles, butterflies, moths, termites, spiders; and 10% others consist of vertebrate such as small birds, lizards, geckoes, and small snakes (Niemitz 1984, Haring & Wright 1989, Sussman 1999, Supriatna & Wahyono 2000, Gursky 2000).

The length of adult tarsier is only around 12-13 centimeters and its weight is 100-140 grams, and its infant weight 25-33% of the mother's weight at birth (Sussman, 1999). The length of its tail is two times longer than its body and its hind limb is longer than its up limb. Tarsiers also has huge eyes and ears which are relatively bigger compared to their heads, lacking a reflecting tapetum lucidum and their heads can make a 1800 spin without moving their bodies (Supriatna & Wahyono 2000, Shekelle & Leksono 2004)

Social unit of tarsiers are different among species. Supriatna & Wahyono (2000) pointed out that commonly 80% of Tarsius tarsier (=Tarsius spectrum) live in pairs (monogamous) and only about 20% is multimale-multifemale. There are 2-6 individuals within a group. Their gestation period is about 180-190 days and they can live for 12 years. Unlike Tarsius tarsier, Tarsius bancanus is more solitary or living in pairs to create their home range. However, social systems of other species need further study.

Like many others endemic primate, tarsiers are threatened by human activities, particularly when the forests where they are habitat of are converted into plantations and transmigration settlements. Forest clearance, illegal logging, and burnings are some other hazards that also bring negative impact to the tarsiers. These activities can change the natural habitat of tarsiers into isolated, degradated, or fragmented ones. Merker et al. (2005) reported that in Lore Lindu National Park, Central Sulawesi the population of Tarsius dianae in a highly-disturbed habitat occupied by 45 individuals per km2 was smaller than the one in a low-disturbed habitat occupied by 268 individuals per km2. In a short term, impact of human activities might reduce the population of tarsiers, but in a long term, may lead to the extinction (Merker & Muhlenberg 2000). This fact is worsening by unsuccessful tarsiers breeding in captivity even in countries that have good facilities (Haring & Wright 1989). Therefore, a conservation to save the unique animal is a priority. Conservation of tarsiers is both in-situ and ex-situ. Captive breeding is one form of ex-situ conservation.

Tohari (1987) pointed out that an animal should be captivated if from time to time their field population decreases and is likely to extinct. One of the benefits of captivity is to reduce human reliance to nature population of wildlife (Alikodra 2002). The most important and beneficial reason for maintaining animal in captivity is to educate the public (Larson & Schulze 2001). Shekelle & Leksono (2004) noted that besides breeding, tarsier captivity is useful for researching, training, and establishing public awareness, and mainly changing the false belief of the local community about tarsiers. Moreover, if tarsiers in captivity die naturally, they may be used as a type specimen in museum.

Information about the number of species, distribution, taxonomy, and social system of tarsiers is needed to assist the conservation program of Indonesia tarsiers. Thus, an identification of the species and the habitat of wildlife is one of the conservation objectives. The identification result presented a description of wildlife species and the regions that significant for the conservation. In addition, the result identification can provide a recommendation for new species naming or for identification of new conservation region (Trainor & Lesmana 2000). Shekelle & Leksono (2004) has recommended using tarsiers as flagship species to promote and designed a new conservation area in Sulawesi and its surrounding small islands. Besides, the vocalization analyses showed that there are 11 populations of tarsiers in the region that are possibly new species. For identification purposes, one efficient method is collecting taxonomic information from tarsier's tail tuft using multivariate technique. This technique can be applied to both living and non-living animals, including specimen which is collected in museum. The method is also applicable for local people in one region who has no modern equipment for conducting a research.

Conservation of tarsiers has faced some problems, some of which are limited population of tarsiers which have not yet been identified, human destruction of their habitat, expensive research for identification, and unsuccessful tarsiers breeding in captivity. Efforts to find inexpensive method for identification and to design suitable captive breeding are very important and urgent to carry out now. The results of this research might be useful for conservation of tarsiers.