

Distribution, Demography and Basic Husbandry of the Asian Elephant in the Tourism Industry in Northern Thailand

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Introduction

The captive and wild populations of Asian elephants in Thailand are almost entirely geographically isolated from each other. The captive population, comprising approximately 60% of the total population, is found mainly in the North and Northeast of the country whereas the isolated wild populations, numbering a total of 1000-1500 individuals (Lair 1997; Lohanan 2002), are distributed primarily in the Central and Western regions, most of which are in protected areas (Pimmanrojngool & Wanghongsa 2002).

Legislatively, wild elephants are included in the 1992 Wildlife Protection Act granting them basic protection from anthropocentric use. The captive population however comes under the somewhat outdated 1939 Draught Animal Act, in which elephants are classified as working livestock, similar to cattle, buffalo and oxen. Internationally, the Asian elephant is listed as "Endangered" on the IUCN Red List (IUCN 2008) and is thus protected under the CITES Act (UNEP-WCMC).

The low birth rate in captivity and a change in the preference in the age and gender of captive elephants in Thailand have led to a strong need to harvest wild and foreign individuals, especially from Myanmar. The financial sustainability of elephant husbandry is currently threatened by the decrease in availability of forested areas (from 90% to 22% of the national land area over the last century) and the rising prices of cultivated foodstuffs globally (Kashio 1997; Lakanavichian 2001). The diet of the elephant in the wild is composed of a large diversity of plant types (Sukumar 1989; Samansiri & Weerakoon, 2007; Campo-Arceiz *et al.* 2008; Phuangkum *et al.* 2005). Captive elephants consumed wild forage

and food provided to them by owners – 'bought food' which is defined here as comprising all ready cut food stuff, being imported into the camp from a remote source and involving a monetary transaction. This food source is usually low in plant diversity and provides the bulk of energy food for the elephants. Wild forage on the other hand may be defined as the usually nocturnal or seasonal foraging of the elephants in forested areas, be they private or public, providing many essential nutrients and minerals.

A ban on all logging activities, implemented in 1989, rendered 70% of the captive elephants in Thailand without work practically overnight (Lakanavichian 2001; Tippraset 2002). The current lack of employment for the remaining captive population is considered to be one of the major problems for elephant conservation in Thailand (Ratanakorn 2002; Lohanan 2002; Lair 2002). Upon implementation of the ban, a large percentage of elephants were transferred to the growing tourism industry, to be used for rides, shows (Fig. 1) and entertainment (Lair 1997).

Materials and Methods

The purpose of this study was to gain a better understanding of the relationships between the demography and husbandry conditions of elephants in the tourism industry. Ownership was correlated with age, gender, and the diet of the surveyed elephants using chi square (X^2) statistical analysis.

Four provinces within Northern Thailand, Chiang Mai, Chiang Rai, Mae Hong Son and Lampang were identified as having the highest density of elephants involved in tourism. Data collection was carried out over a period of two months from mid April 2008 to mid June 2008.



Figure 1. Young elephant doing tricks in a show at the Surin Elephant Festival.

The data was collected and recorded by individual camps using a basic questionnaire. Age was categorised into five categories (0-10, 11-20, 21-30, 31-40 and 40+) and verified using the criteria for age determination provided in Phuangkum *et al.* (2005). Ownership was categorised into four groups, based on Lair’s (1997) distinction between those owners who physically maintain their elephants (mahout owners) and those who assign this task to a hired mahout (remote owners), followed by ‘State ownership’, government run facilities with state owned elephants, and ‘camp ownership’: elephants owned by the camps in which they work. Interviews with the managers provided information on the feeding strategies and diet composition. All the data was recorded on a single questionnaire, filled out by the research team. A copy of the questionnaire in Thai was made available to the interviewee.

Table 1. Gender ratios of each age category.

Sex	Average	0-10 years	11-20 years	21-30 years	31-40 years	40+ years
Females	68%	54%	73%	76%	72%	63%
Males	32%	46%	27%	24%	28%	37%

Elephants were categorised depending on their access to wild forage and their dependence on bought food stuffs.

Results and Discussion

Categorising the sample of 543 elephants by age groups showed equal distributions (20%) of elephants in the first three age groups (0-11, 11-20, 21-30 years) and a peak in the fourth group (31-40 years) with 26% of the sample. This could represent the remnants of the logging force left from before the ban on logging, nearly 20 years ago. The last age group (40 years and over) only comprised 15% of all individuals.

The gender ratio for the total sample was found to be 1:2.13 (male:female), explained by Lair (1997) as the particular demand for strong males in illegal logging activities and the relative docility of the females making them more suitable for work in close proximity to tourists. This gender ratio however varied significantly across the studied area. Figure 2 shows the gender ratio for each district surveyed within the four provinces.

The majority of captive elephants are located in Chiang Mai province, with Mae Taeng district having the largest captive population. The gender ratios for each district show a majority of females, with the exception of Lampang and Chiang Rai, comprising 58% and 71% males respectively. Both subpopulations of Muang Chiang Mai and Pai districts are composed solely of females. This variation, ranging from 100% female in Pai district to nearly 75% males in Chiang Rai district, was not found to be correlated to ownership or age, but to the nature and ancestries of the facilities, ex-logging concessions having a higher male component.

When correlating age with gender, only the first age group deviates from the average by more than 10 percent, with a male:female ratio of 1:1.17 (Table 1). The high and growing demand for young elephants seems to have led to some

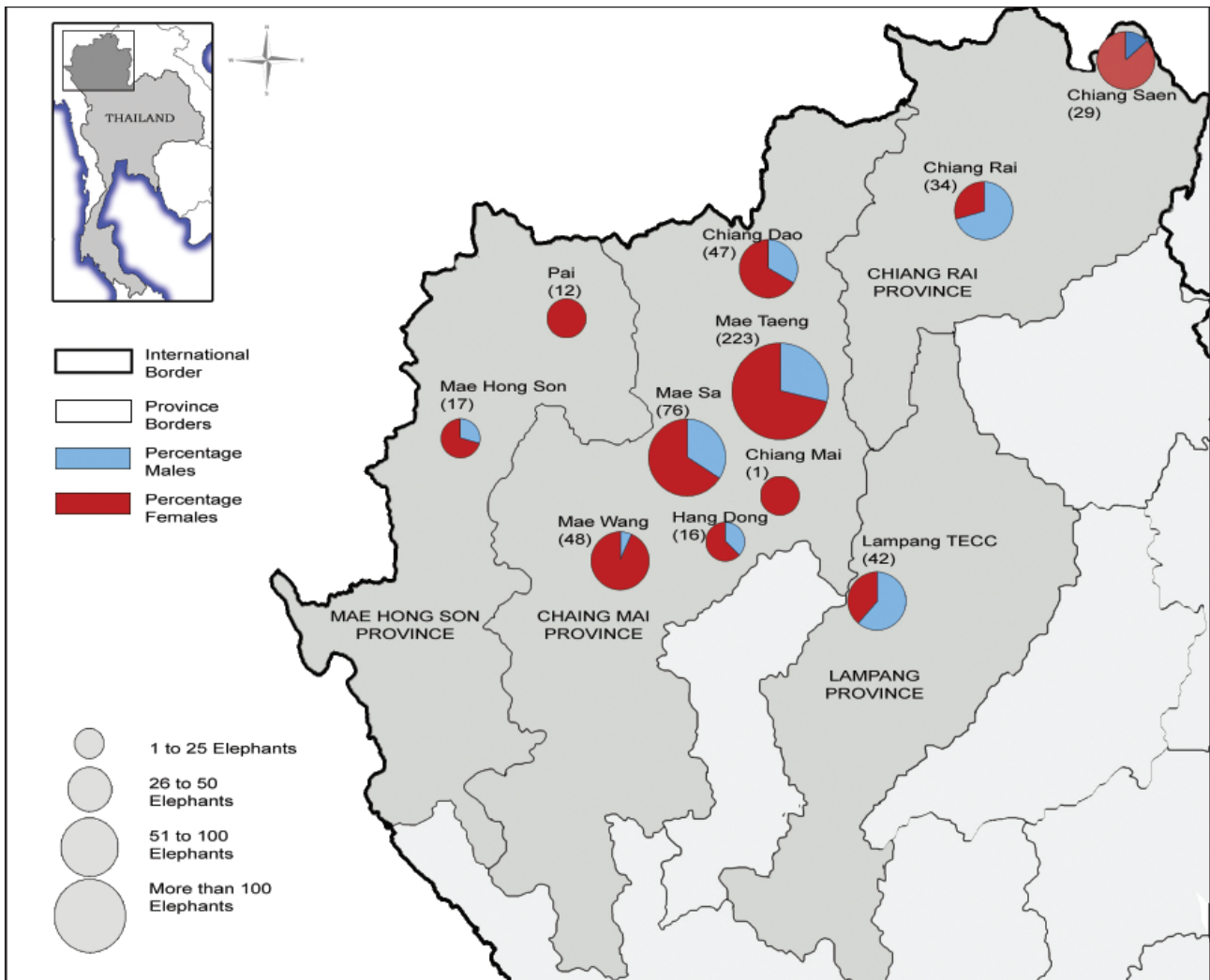


Figure 2. Map of the distribution and gender ratios of elephants in the study area by district.

ambivalence by buyers with respect to the gender of the calves. From 20 years onwards, the elephants are predominantly used for riding and docility becomes the predominant criteria for selection. This explains in part the increase of females and the decrease of males for older age groups.

Only one in ten elephants in the survey was owned by the state. Mahouts formed the largest ownership group with 37% of all individuals in the sample, followed by 32% being owned by the tourism camps and the remaining 22% being owned by private non mahout owners (remote owners). Ownership was found to be significantly correlated to age, gender and diet using Chi Square to 95% accuracy. When comparing these results to Tippraserts' data from 2004 on the same population, there has been a noticeable shift in ownership from camp owners to mahout owners, representing a decrease in stability of

the tourism industry. This bears more weight when considering the effect that events such as the 2004 tsunami and the political unrest in 2008 have had on the tourism industry in Thailand.

Table 2 shows the results of the Chi Square analysis between ownership and age, gender and diet of the surveyed elephants. All correlations were found to be significant to 95% accuracy.

The dominance of mahout ownership spans the five age groups with the exception of the 31-40 years category, with camps owning the majority of elephants in this group. Table 3 shows the

Table 2. Results from the Chi Square analysis.

Correlates	X^2	<i>df</i>	P value
Ownership			
-with Age	43.38	12	0.000
-with Gender	15.89	3	0.001
-with Diet	62.11	3	0.000

Table 3. Type of Ownership by age category.

Ownership	Average	0-10 years	11-20 years	21-30 years	31-40 years	40+ years
Camp	32%	29%	26%	36%	43%	20%
State	10%	15%	8%	9%	4%	17%
Mahout	37%	39%	34%	44%	34%	32%
Remote	22%	17%	33%	11%	20%	32%

ownership composition for each age category. Elephants are at the peak of physical fitness in their thirties (Pimmanrojngool & Wanghonga 2002), which would explain the high number of camp owned individuals in the fourth age group, as they are used to give rides.

The gender ratio varies significantly across the four types of ownerships (Table 4). Mahout owners show a ratio of nearly three female elephants for every male (1:2.85) whereas the state has a nearly equal number of males and females, (1:1.17). This is due to the fact that the majority of elephants (86%) owned by the state are found in the Lampang TECC, which has a male dominated, ex-logging subpopulation. When compared to the average ratio for the sample, both remote and camp owners showed little variation.

Of the 543 elephants surveyed, every elephant was dependent, at least partially, on food purchased from a third party, concurrent with figures given by Phuangkum *et al.* (2005). The bought forage was found to consist of, but was not limited to, elephant grass (*Pennisetum purpureum*), sugar cane (*Saccharum officinarum*), banana tree and fruit (*Musa sapientum*) and a variety of bamboo species (*Bambusa* sp.). Nearly half of the elephants in the sample were found to have no regular access to wild forage, therefore being fully dependant on bought or cultivated foods.

When correlating ownership with diet (Table 5) it appears that a higher percentage of both remote and mahout owners fail to provide their elephants with any wild forage, while a higher percentage of

Table 4. Gender ratios of each ownership type.

Ownership	% females	% males
Remote	64	36
Mahout	74	26
State	46	54
Camp	71	29

both state and camp owners provide wild forage for their elephants on a regular basis (Fig. 3). The ability for both state and camp owners to provide wild forage for their elephants may be because they usually own land and are therefore able to allow their elephants to graze on it; whereas mahout owners may have less access to such land and would therefore be forced to buy foodstuff for their elephants. Phuangkum *et al.* (2005) go on to describe the relationship between ownership and diet, suggesting that remote ownership is oftentimes deleterious to the elephant's nutrition. The data analysis for this study produced similar results, also finding remote owner category to provide the elephants with the least access to wild forage.

Table 5. Percentage of wild forage for each type of ownership.

Ownership	% other forage	% wild forage
Remote	64	36
Mahout	62	38
State	19	81
Camp	32	68

Conclusion

- A comprehensive map of the study area has been produced and zones with the largest subpopulations identified as being proximal to highly touristic areas such as the cities of Chiang Mai and Chiang Rai.
- The captive population is deemed relatively stable with the recent revival in recruitment, especially of calves; this being attributed to the growth in demand from the tourism industry.
- The distribution of elephants into age categories was found to be relatively equal with a peak in the 31-40 years age group.
- The average gender ratio within the industry was found to be approximately two females per male, but factors such as illegal logging,



Figure 3. Bringing the elephants into camps after a night of foraging, Chiang Rai Province.

behaviour, the high demand for calves and historical distribution have induced variations in the ratio throughout the study area.

- All elephants in the study are dependent, to some level, on bought forage. Remote owners provide the least access to wild forage.
- The equal gender ratio for the youngest age group of elephants was attributed to the high demand and limited availability of young calves, leading to a lack of choice regarding gender.
- Better registration is needed to monitor and record the breeding rate in what seems to be a potentially fertile population.

This study suggests that social and economic factors have a strong influence on the demography and structure of the captive population working in tourism. Therefore, future research is suggested to be focused on the socio-economic conditions of those owning or working with elephants.

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Figure 4. A well maintained elephant shelter in Chiang Rai Province, Northern Thailand.