

# DIET AND FEEDING BEHAVIOR OF ASSAMESE MACAQUES (*Macaca assamensis*) AT THAM PLA TEMPLE, CHIANG RAI PROVINCE, NORTHERN THAILAND

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## ABSTRACT

A study of diet and feeding behavior of Assamese macaques (*Macaca assamensis*) at Tham Pla Temple, Chiang Rai Province, northern Thailand was conducted from September 2011 to September 2012. The scan sampling technique was used to determine diet and feeding behavior. Five botanical plots were established covering the temple ground to evaluate the availability of plant species. The macaques consumed more provisioned food (54.7%) than natural food (45.3%). They forage on natural food particularly in the mornings (0600-1000) whereas provisioned food was eaten mainly from 1200 to 1500. Their feeding behavior varied across the months. The highest percentage of feeding on the provisioned food was 72.8% in January 2012 and 57.8% on natural food in May 2012. They spent large proportions of feeding on fruit accounting for 54.7% of total natural food consumption followed by leaves (29%), flowers (8.7%), seeds (5%), animal matter (2.4%) and inner bark (0.2%). Although the macaques fed on varieties of 55 plant species, only five plant species contributed to 48.1% of the total natural diet including *Muntingia calabura*, *Tamarindus indica*, *Ficus glaberrima*, *Ficus religiosa* and *Mangifera caloneura*. The macaques were provisioned with many kinds of foods such as peanuts, bananas and other fruits. They were observed to consume mainly peanuts (40.5%). Provisioned food provides an essential food supply to macaques but an excess of food can deteriorate macaques' health. Therefore, a balance of dietary composition between natural food and provisioned food is important for the macaques' survival and health.

**Key words:** Assamese macaque, balance diet, feeding behavior, scan sampling method, Thailand.

## INTRODUCTION

Diet and feeding behavior of primates have been primary topics to study for many decades (Maruhashi, 1980; Post, 1982; Agetsuma, 1995; Hanya, 2004; Xiang *et al.*, 2012). The information on diet is essential to understand dietary composition (Yeager, 1996; Hill, 1997) and food selection (Agetsuma, 1995; Hanya, 2004). Many studies revealed the species-specific dietary characteristics in macaques. For example, 1) frugivorous: Long-tailed macaques (*Macaca fascicularis*) (Yeager, 1996), Crested black macaques (*Macaca nigra*) (O'Brien & Kinnaird, 1997) and Tonkean macaques (*Macaca tonkeana*) (Riley, 2007). 2) folivorous: Rhesus macaques (*Macaca mulatta*) (Goldstein & Richard, 1989), Japanese macaques (*Macaca fuscata*) (Hanya, 2004) and Assamese macaques (*Macaca assamensis*) (Chalise, 2003; Zhou *et al.*, 2011). However, a specific dietary type is sometimes difficult to classify as frugivorous or folivorous due to no significant difference in their dietary compositions and selections (Hill, 1997).

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Macaques are distributed in a wide range of habitats particularly near human habitations such as cities, towns, villages and temples (Southwick & Siddiqi, 1977; Aggimarangsee, 1992, 2013). They adapt their feeding behavior to rely on both natural and provisioned foods. For example, Lucas & Corlett (1991) found that long-tailed macaques in Bukit Timah Nature Reserve, Singapore spent 14% of the feeding time on provisioned foods and 59% on natural food. Aggimarangsee (1992) reported the percentages of solid food eaten by Assamese macaques at Tham Pla Temple, Thailand, include provisioned food (71.2%) and natural food (28.8%). Alami *et al.* (2012) studied the diet of a semi-provisioned troop of Barbary macaques in Morocco, they relied on human made food for 26% and on natural food for 74%.

The Assamese macaques belong to the primate genus *Macaca* (Fooden, 1986). They are one of the six macaque species that occur in Thailand today (Roos *et al.*, 2014): Long-tailed macaques (*Macaca fascicularis*), Rhesus macaques (*Macaca mulatta*), Stump-tailed macaques (*Macaca arctoides*), Northern pig-tailed macaques (*Macaca leonina*) and Sunda pig-tailed macaques (*Macaca nemestrina*). The International Union for Conservation of Nature (IUCN) has classified Assamese macaques as “near threatened” (Boonratana *et al.*, 2008). More alarmingly, Thailand Red Data: Vertebrates (2005) classified them as “endangered”. Malaivijitnond *et al.* (2005) reported the habitat sites of Assamese macaques in Thailand including Tham Pla Temple, Mae Sai District, Chiang Rai Province; Tham Pa Tha Pol Non-Hunting Area, Noen Maprang District, Phitsanulok Province; Klonglan Waterfall, Klonglan National Park, Klong Lan District, Kamphaen Phet Province; Umphang Wildlife Sanctuary, Umphang District, Tak Province; Khao Laem Dam, Thong Pha Phum District, Kanchanaburi Province and Erawan Waterfall, Sai Yok District, Kanchanaburi Province. An additional habitat site of this species has been reported in Phu Khieo Wildlife Sanctuary, Phu Khiao District, Chaiyaphum Province (Furtbauer *et al.*, 2010; Ostner *et al.*, 2011). Of these habitats, the diet and feeding behavior were reported for only Tham Pla Temple, Chiang Rai Province (Aggimarangsee, 1992). Long-term and systematic study on diet and feeding behavior of this species in Thailand is still scarce.

To examine and better understand the diet and feeding behavior of Assamese macaques at Tham Pla Temple, dietary composition, monthly variation in feeding behavior, and time spent feeding on natural and provisioned food were determined. Long-term and systematic information on diet and feeding behavior are important for supplementing the fundamental knowledge of this species and also provide essential data to manage and conserve the macaques in the future.

## MATERIALS AND METHODS

### Study Site

Tham Pla Temple is located in Mae Sai District, Chiang Rai Province (20°19'N, 99°51'E). The temple is situated on the eastern side of Tham Pla Mountain in the Nang Nawn Mountain range. The temple ground covers an area of 17.6 ha at an altitude of 408 m (Aggimarangsee, 1992). The majority of vegetation of the Nang Nawn Mountain is a deciduous forest with a mix of hardwood species and bamboos (Maxwell, 2007).

### Data Collection

The study of diet and feeding behavior of four Assamese macaque groups was conducted from September 2011 to September 2012. Group size was 36, 45, 50 and 59 individuals respectively at the onset of the study and 40, 45, 48 and 66 individuals at the end of the study. Scan sampling technique was used to obtain information on diet and feeding behavior (Altmann, 1974). Five individuals were recorded for a maximum of five minutes within each 15 minutes interval from dawn to dusk (0600-1800) for seven days per month. To avoid sampling bias, the observation began from right to left or left to right

until all individuals in a group were scanned. The feeding behaviors included manipulation and mastication of food items. The food items consisted of natural and provisioned food. The natural foods included parts of natural plant species such as mature leaves, young leaves, fruit, and flowers. The provisioned foods provided by humans included peanuts, bananas, fruit and rice.

Five botanical plots, each 50 m x 100 m, were established covering the temple ground to evaluate the availability of plant species. All tree stems with a minimum of 20 cm in girth at breast height (1.3 m) were tagged and identified. The trees in the botanical plots were monitored monthly to examine the presence or absence of plant parts.

To determine dietary composition, percentages of time spent feeding on food items were calculated from the number of feeding records on each of the food items divided by the total number of feeding observations. T-test was used to examine differences between the time spent feeding on provisioned and natural food. All statistical tests were two tailed and tested using SPSS program version 17.0 with significant values of 0.05.

## RESULTS

A total of 5,830 feeding records derived from 1,166 scans revealed that Assamese macaques spent 54.7% feeding time on the provisioned food and 45.3% on the natural food (T test:  $t = -3.1$ , d.f. = 24,  $p = 0.005$ ).

### Diurnal Variation in Feeding Behavior on Natural and Provisioned Food

The macaques started the day around 0500-0600 at the sleeping trees and traveled to the temple ground around 0700-0800. They foraged on the natural food particularly in the mornings (0600-1000) and the highest percentage of feeding on natural food was 79.3% at 0700 (Figure 1). They were observed to consume provisioned food mainly from 1200 to 1500, this peaked at 1300 when the percentage of provisioned food consumed was 80.7%.

### Monthly Variation in Feeding Behavior on Natural and Provisioned Food

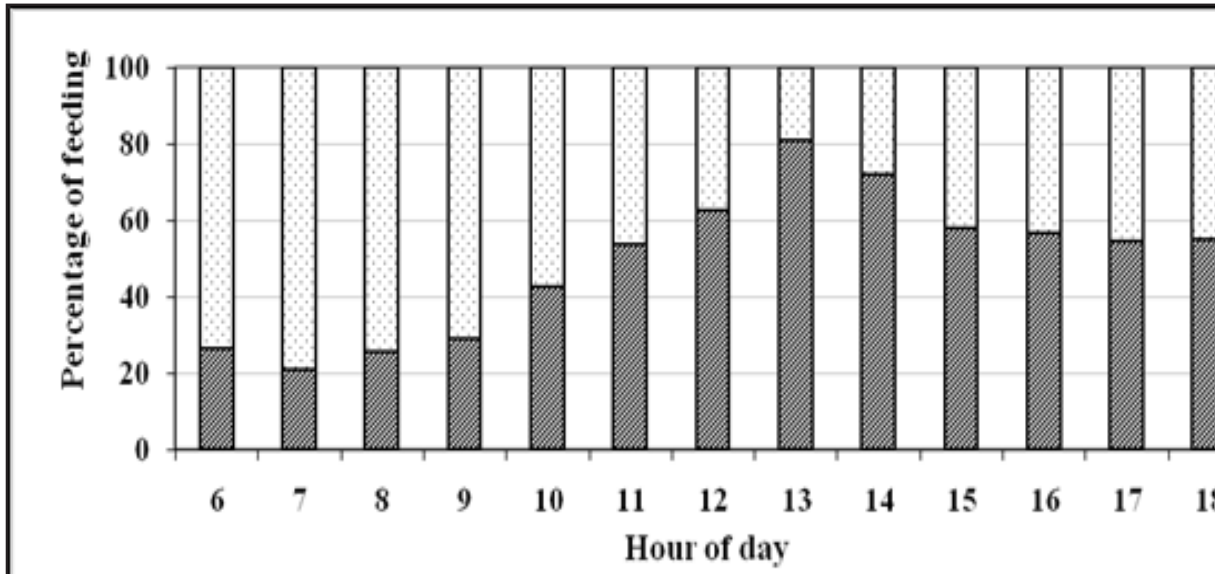
The percentage of the feeding on the provisioned food was higher than the natural food almost year round (September 2011-February 2012, June 2012, and August 2012-September 2012) (Figure 2). A peak of the provisioned food consumption (72.8%) was observed in January 2012. The natural food contributed large percentage of feeding (57.8%) in May 2012. The percentage of time allocated to feed on the natural food and the provisioned food showed similar values in June 2012.

### Availability and Phenology of Plant Species

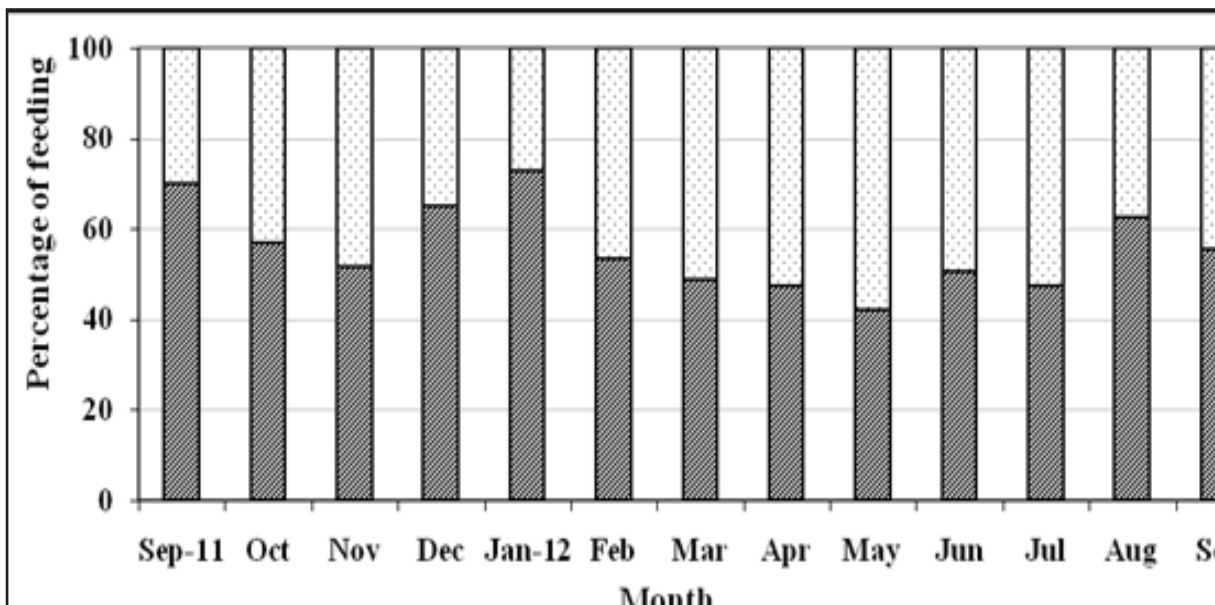
There were 143 trees individuals of 43 species in the five botanical plots. The five most common tree species found in the botanical plots were *Tectona grandis* (50 trees), *Cassia fistula* (7 trees), *Pterocarpus macrocarpus* (7 trees), *Delonix regia* (6 trees) and *Mangifera caloneura* (5 trees). The overall percentage of plant parts observed from the five botanical plots is presented in figure 3. The mature leaves were observed throughout the year, except from February 2012 to May 2012 when some trees such as *Tectona grandis* and *Erythrina subumbrans* totally shed their leaves. Young leaves were found mostly from June 2012 to August 2012. Flowers were produced mainly between April 2012 and July 2012. Fruit were mostly available from February 2012 to May 2012.

**Nature Food**

The macaques were observed to consume large quantities of fruit, accounting for 48.0% of the total feeding time on natural food, followed by leaves (25.4%), drinking (12.2%), flowers (7.7%), seeds (4.4%), animal matter (2.1%) such as weaver ants, termites, butterfly caterpillars and grasshoppers and inner bark (0.2%) (Figure 4). For reasons yet to be disclosed, the percentage of time spent drinking is very high in the study population. When drinking is excluded, the total feeding time on natural food was highest for fruit accounting for 54.7% followed by leaves (29%), flowers (8.7%), seeds (5%), animal matter (2.4%) and inner bark (0.2%) (Figure 5).



**Figure 1** Diurnal variation in percentage of feeding on natural food and provisioned food.



**Figure 2** Monthly variation in percentage of feeding on natural food and provisioned food

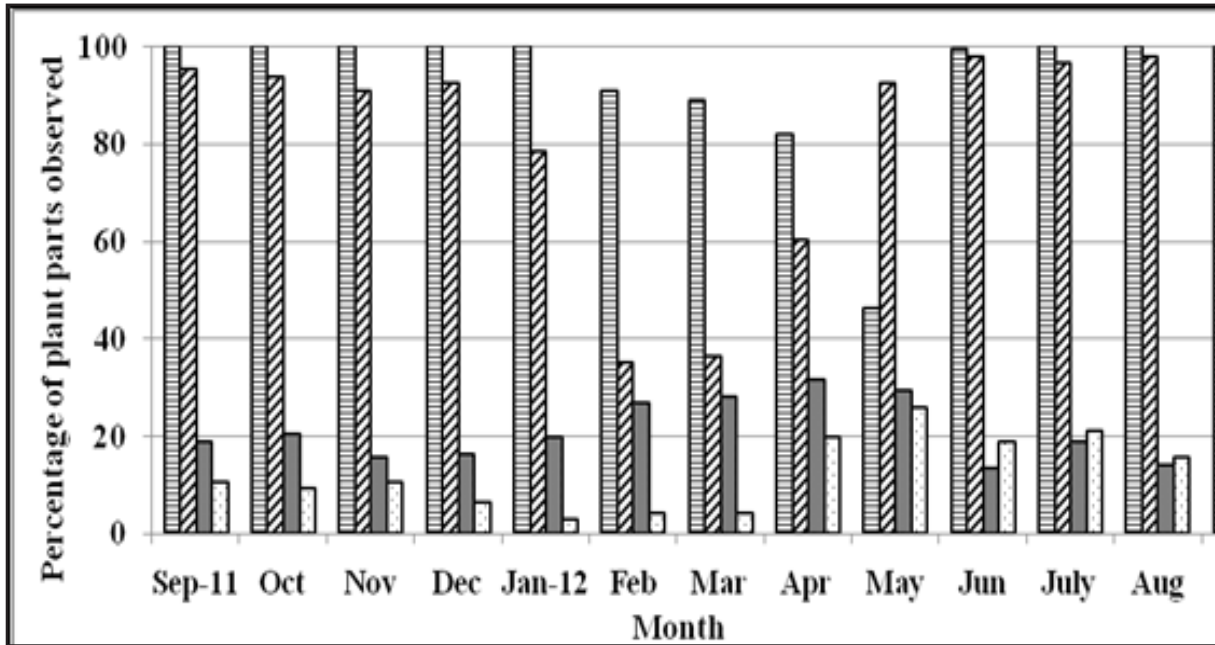


Figure 3 Overall percentages of plant parts observed in five botanical plots from September 2011 to September 2012.

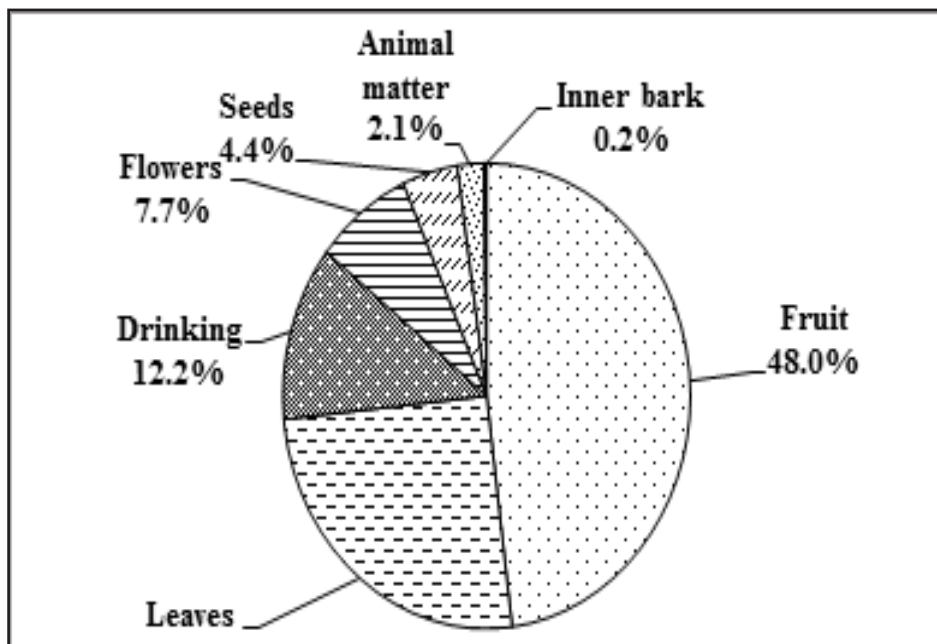


Figure 4 Overall percentage of feeding on various natural food.

The macaques were observed to feed on 55 plant species (Appendix 1). They spent most the feeding time on five plant species accounting for 48.1% of total feeding on the natural plants including *Muntingia calabura* (12.5%), *Tamarindus indica* (12.0%), *Ficus glaberrima* (9.5%), *Ficus religiosa* (7.1%) and *Mangifera caloneura* (7.0%). They consumed fruit of *Muntingia calabura* and young leaves of *Tamarindus indica* more often than other plant species (Figure 6). The macaques were observed to feed on the fruit of *Muntingia calabura* throughout the year whereas their flowers were eaten mainly from October 2011 to February 2012. They consumed young leaves of *Tamarindus indica* almost year round, except from November 2011 to January 2012 and their fruit were eaten mostly from October 2011 to December 2011 and from July 2012 to September 2012.

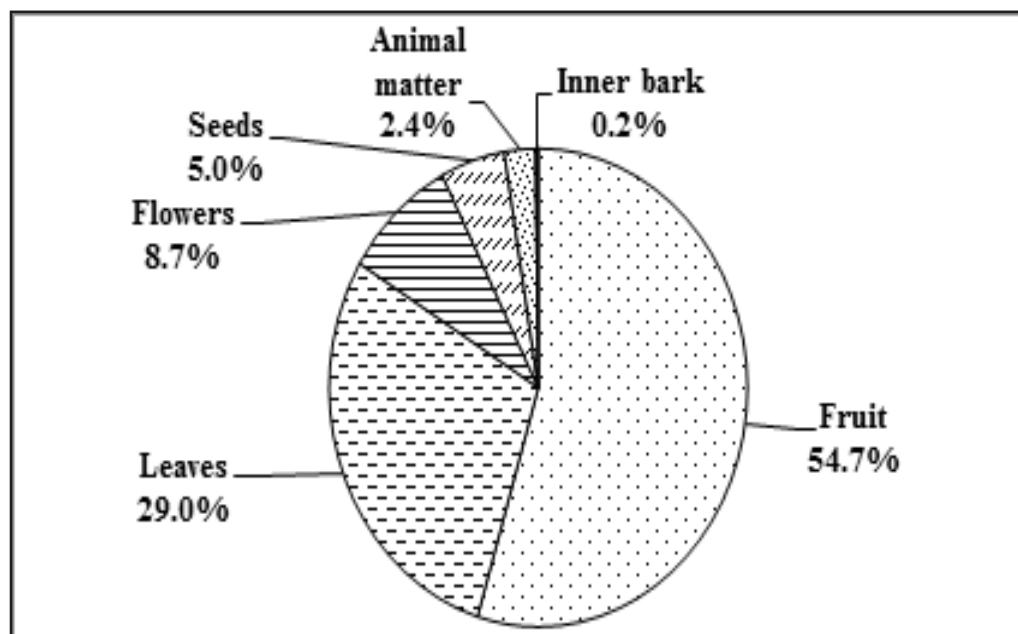


Figure 5 Overall percentage of feeding on various natural food.

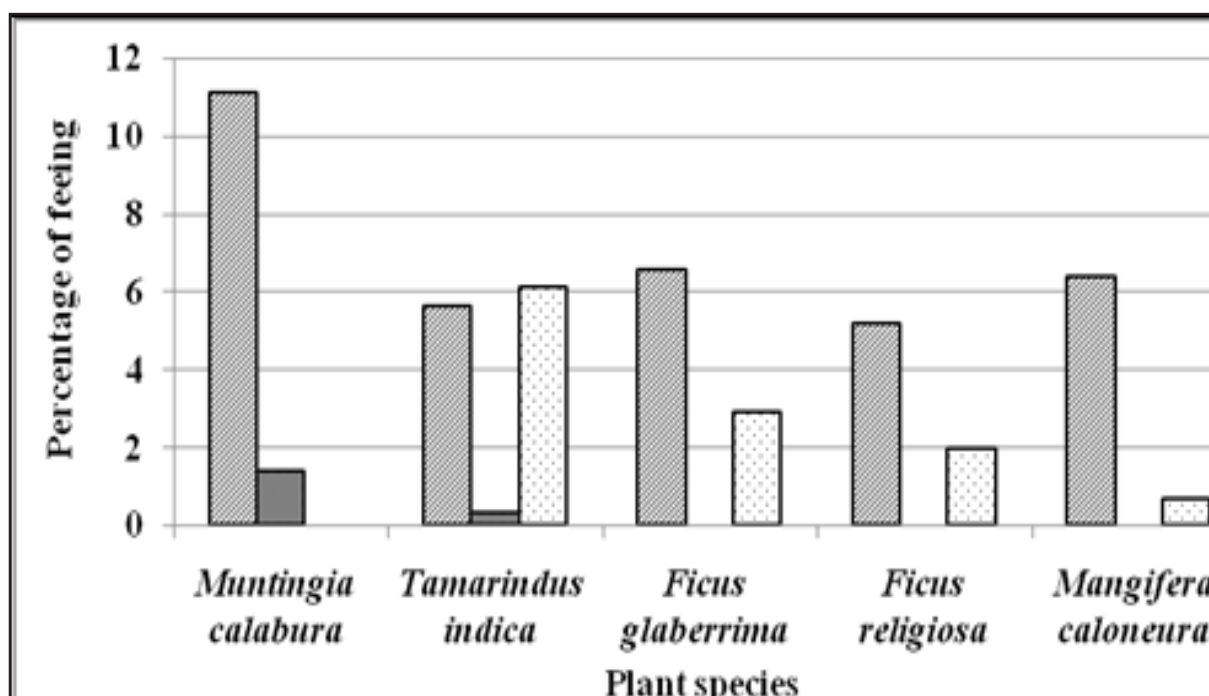


Figure 6 Percentage of feeding on plant parts of top five plant species consumption.

### Provisioned food

The macaques were provisioned with many kinds of unprocessed and processed food (Table 1). They were observed to consume a large amount of peanuts, accounting for 40.5% of the total feeding on the provisioned food, followed by bananas (22.6%), other fruits (14.8%), such as papaya, pineapple, watermelon, mango, coconut, longan, orange, guava, apple and rambutan, and vegetables (3.6%). The percentage of feeding on the processed food consisted of pet food (6.6%), cooked rice (5.4%), snacks (3.2%), bread (1.6%), beverages (1.0%) and ice cream (0.7%).

**Table 1** Overall percentage of feeding on each provisioned food.

Unprocessed food	Feeding (%)	Processed food	Feeding (%)
Peanuts	40.5	Pet food	6.6
Bananas	22.6	Cooked rice	5.4
Other fruits	14.8	Snacks	3.2
Vegetables	3.6	Bread	1.6
		Beverages	1.0
		Ice cream	0.7
Total	81.5	Total	18.5

## DISCUSSION

The Assamese macaques at Tham Pla Temple were observed to consume more of the provisioned food (54.7%) than the natural food (45.3%). The proportion of the feeding on the provisioned food was higher than the natural food, similar to Aggimarangsee (1992) who reported that the Assamese macaques at Tham Pla Temple in 1991 fed more on the provisioned food (71.2%) than the natural food (28.8%). Fuentes *et al.* (2007) found that the dietary composition of the long-tailed macaques at Padangtegal, Bali, Indonesia in 2003 comprised of the provisioned food (70%) and the non-provisioned food (30%), they also reported the feeding composition of the Barbary macaques at Gibraltar in 2006 consisted of the provisioned food (76%) and the non-provisioned food (24%). Kaewpanus (2010) reported the diet of Assamese macaques at Tham Pla Temple from February 2009 to January 2010 consisted of the provisioned food (61.7%) and the natural food (38.3%). These reports suggest that macaques living in temples and tourist sites have more opportunities to receive large amounts of food from humans, similar to Kaewpanus (2010) who found that many groups of people, such as monks, locals, hawkers and tourists, visit the Tham Pla Temple throughout the year and often feed the macaques with large quantities of food. Therefore, the macaques tend to rely more on the provisioned food than the non-provisioned food.

The diurnal variation in feeding behavior revealed that the macaques consume more natural food in the morning (0600-1000) whereas the provisioned food was eaten mainly in the afternoon (1200-1500). This pattern is similar to Kaewpanus (2010) who reported that Assamese macaques at Tham Pla Temple fed on natural food mainly in the mornings (0700-1000) and they consumed more provisioned food in the afternoons (1200-1500). Fewer tourists visit the temple and provide food to the macaques in the mornings therefore, they spent more feeding time on the natural food. Most tourists visit the temple in the afternoons and feed the macaques with large amounts of food. Thus, the macaques were observed to consume more provisioned food in the afternoons.

The monthly variation in the feeding on the natural food and the provisioned food indicated that the macaques consumed more provisioned food than natural food almost year round, which resulted from the availability of the provisioned food throughout the year, similar to Kaewpanus (2010). However, they were observed to consume larger amounts of natural food than provisioned food from March to May 2012 and July 2012. It was found that many plant species produced varieties of edible plant parts during those periods (Figure 2). For example, flowers were produced

mainly between April 2012 and July 2012. Fruit were found mostly from February 2012 to May 2012. Therefore, the macaques spent more the feeding time on the natural food than the provisioned food from March to May 2012 and July 2012.

The Assamese macaques at Tham Pla Temple were observed to consume 55 plant species. This is different from Mitra (2002) who reported that 63 plant species were eaten by the Assamese macaques in Darjeeling, West Bengal, India during 1996-1999. Zhou *et al.* (2011) found that Assamese macaques fed on 69 plant species at Nonggang Nature Reserve, China from September 2005 to August 2006. Heesen *et al.* (2013) found that a group of wild female Assamese macaques consumed 118 plant species at Phu Khieo Wildlife Sanctuary, northeastern Thailand from October 2007-September 2008 and May 2010-April 2011. The habitat and availability of the plant species contributed to the difference between the number of plant species eaten by the Assamese macaques at Tham Pla Temple and other habitats studied. Tham Pla Temple is surrounded by fragmented areas with agriculture areas and human communities (Kaewpanus, 2010). Therefore, the number of natural plant species found in the temple ground is smaller than those of the natural habitat in West Bengal, India (Mitra, 2002), limestone forest in Nonggang Nature Reserve, China (Zhou *et al.*, 2011) and Phu Khieo Wildlife Sanctuary, Thailand (Heesen *et al.*, 2013).

The Assamese macaques at Tham Pla Temple tended to be primarily frugivorous. Their feeding on fruit accounted for 54.7% of the total natural diet whereas leaves constituted 29 %. This pattern is similar to Schuelke *et al.* (2011) who found that Assamese macaques at Phu Khieo Wildlife Sanctuary, Thailand fed mainly on fruit 42.4% on average across age-sex-classes and leaves (21.2%), Heesen *et al.* (2013) reported that a group of wild female Assamese macaques at Phu Khieo Wildlife Sanctuary, Thailand consumed more fruit (56%) than leaves (12.8%), Yeager (1996) reported that the long-tailed macaques in Kalimantan, Indonesia consumed fruit (66.7%) and leaves (17.2%). O'Brien & Kinnaird (1997) found that the crested black macaques in Sulawesi, Indonesia, fed on fruit (66%) and vegetative material (2.5%). These studies suggest that the macaques tend to consume more fruit than other plant parts due to abundance and availability of fruit. For example, Yeager (1996) found that the total percentage of the available fruit per month correlated positively with the percentage of the feeding on fruit. O'Brien & Kinnaird (1997) reported that the availability of fruit species (>145 fruit species) in Sulawesi, Indonesia contributed to an increase in feeding on fruit. However, the natural diet of the Assamese macaques is different from the previous reports. For instance, Ahsan (1994) reported the dietary composition of the Assamese macaques in Bangladesh included leaves (46%) and fruit (23%). Chalise (2003) observed that Assamese macaques in Nepal were primarily leaf eaters. Zhou *et al.* (2011) reported that the Assamese macaques at Nonggang Nature Reserve, China, consumed more leaves (74.1%) than fruit (17.4%). The plant species found at Tham Pla Temple were mainly introduced trees, for example, *Muntingia calabura*. The trees grow rapidly and produce fruit throughout the year. Therefore, the macaques have become to rely more on their fruit all the year round. This is in contrast to Zhou *et al.* (2011) who reported that Assamese macaques at Nonggang Nature Reserve fed mainly on leaves, due to an abundance of bamboo leaves (*Indocalamus calcicolus*) all year round and the seasonal scarcity of fruit in limestone habitats.

The macaques were provisioned with many kinds of foods, such as peanuts, bananas, provisioning fruit, snack and rice. This is similar to Aggimarangsee (1992) who reported that the Assamese macaques at Tham Pla Temple in 1991 were provided with bananas, rice, crackers, peanuts and popcorn. However, this study revealed that the macaques were observed to consume large amount of peanuts. It seems possible that many tourists always feed the macaques with large quantity of peanuts. Moreover, they preferred to eat peanuts than any other food type (Kaewpanus, 2010). The provisioned foods have both



positive and negative effects on macaques, they are an essential food supply and are important to the macaques' survival. However, an excess consumption of the provisioned food contributes to the deterioration of macaques' health (Aggimarangsee, 1992). Therefore, a balance of dietary composition between natural food and provisioned food is important for the macaques' survival and health.

### ACKNOWLEDGEMENTS

This study was funded by the Science Achievement Scholarship of Thailand (SAST). Thanks to the behavior and ecology of vertebrate research unit department of Biology, faculty of Science, Chiang Mai University for providing equipment in field study. Thanks to Dr. Sawat Sanitjan and Mr. Surachai Moolmaul for their useful comments on the manuscript. Thanks also to Jemma Leeson for her advice. We are grateful to Mr. James F. Maxwell for plant identification. Special thanks to Prof. Dr. Warren Y. Brockelman for valuable comments. We express our gratitude to Dr. Carola Borries for valuable comments and suggestions on the manuscript. We are especially grateful to Dr. Prateep Duengkae for providing us the ongoing opportunity, since 2008, to present our work at the Thailand Wildlife Seminar.

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### APPENDIX 1

List of 55 plant species eaten by Assamese macaques at Tham Pla Temple from September 2011 to September 2012. Abbreviations of plant parts: IB=inner bark, FL=flower, FR=fruit, ML=mature leaf, YL=young leaf, SD=seed.

No.	Scientific name	Family	Life form	Part eaten	Feeding (%)	No. of month seen eaten
1	<i>Muntingia calabura</i>	Tiliaceae	Tree	FL, FR	12.51	13
2	<i>Tamarindus indica</i>	Leguminosae, Caesalpinioideae	Tree	FL, FR, YL	12.01	12
3	<i>Ficus glaberrima</i>	Moraceae	Tree	FR, YL	9.47	11
4	<i>Ficus religiosa</i>	Moraceae	Tree	FR, YL	7.12	7
5	<i>Mangifera caloneura</i>	Anacardiaceae	Tree	FR, YL	7.02	4
6	<i>Artocarpus heterophyllus</i>	Moraceae	Tree	FR, YL	6.86	12
7	<i>Delonix regia</i>	Leguminosae, Caesalpinioideae	Tree	FL, SD, YL	5.46	6
8	<i>Ficus microcarpa</i>	Moraceae	Tree	FR	4.80	6
9	<i>Samanea saman</i>	Leguminosae, Mimosaceae	Tree	FL, SD, YL	4.55	8
10	<i>Streblus ilicifolius</i>	Moraceae	Tree	YL	4.00	11
11	<i>Bouea oppositifolia</i>	Anacardiaceae	Tree	FR	3.80	3
12	<i>Senna siamea</i>	Leguminosae, Caesalpinioideae	Tree	FL, SD, YL	2.60	8
13	<i>Ficus elastica</i>	Moraceae	Tree	FR, YL	2.15	3
14	<i>Thyrsostachys siamensis</i>	Gramineae, Bam- busoideae	Tree	ML, YL	1.85	6
15	<i>Litsea glutinosa</i>	Lauraceae	Tree	FR	1.45	2
16	<i>Syzygium samarangense</i>	Myrtaceae	Tree	FL, FR	1.35	5
17	<i>Acacia auriculaeformis</i>	Leguminosae,	Tree	FR, SD	1.20	4

No.	Scientific name	Family	Life form	Part eaten	Feeding (%)	No. of month seen eaten
		Mimosoideae				
18	<i>Cyperus iria</i>	Cyperaceae	Herb	YL	0.90	4
19	<i>Digitaria bicornis</i>	Gramineae	Herb	YL	0.90	8
20	<i>Pometia pinnata</i>	Sapindaceae	Tree	FR	0.90	1
21	<i>Codiaeum variegatum</i>	Euphorbiaceae	Herb	ML	0.85	4
22	<i>Ficus cyrtophylla</i>	Moraceae	Tree	FR, YL	0.85	2
23	<i>Dendrocalamus nudus</i>	Gramineae, Bam- busoideae	Tree	YL	0.75	5
24	<i>Paspalum conjugatum</i>	Gramineae	Herb	YL	0.75	5
25	<i>Ficus benjamina</i>	Moraceae	Tree	FR	0.50	1
26	<i>Microstegium fasciculatum</i>	Gramineae	Herb	YL	0.50	4
27	<i>Chrysalidocarpus lutescens</i>	Palmae	Tree	FR	0.40	1
28	<i>Moringa oleifera</i>	Moringaceae	Tree	FL	0.40	1
29	<i>Cassia fistula</i>	Leguminosae,	Tree	FR	0.35	3
		Caesalpinioideae				
30	<i>Pterocarpus macrocarpus</i>	Leguminosae,	Tree	FL, SD	0.35	2
		Caesalpinioideae				
31	<i>Bauhinia purpurea</i>	Leguminosae,	Tree	YL, SD	0.30	3
		Caesalpinioideae				
32	<i>Psidium guajava</i>	Myrtaceae	Shrub	FR	0.30	3
33	<i>Morus macroura</i>	Moraceae	Vine	FR	0.25	1
34	<i>Vigna unguiculata</i>	Leguminosae,	Vine	YL	0.25	1
	subsp. <i>Sesquipedalis</i>	Papilionoideae				
35	<i>Borassus flabellifer</i>	Palmae	Tree	FR	0.20	2
36	<i>Momordica charantia</i>	Cucurbitacea	Liana	FR	0.20	1
37	<i>Baccaurea ramiflora</i>	Euphorbiaceae	Tree	FR	0.15	1
38	<i>Bougainvillea spectabilis</i>	Nyctaginaceae	Shrub	FL	0.15	2
39	<i>Euphorbia milii</i>	Euphorbiaceae	Herb	FL	0.15	1

No.	Scientific name	Family	Life	Part	Feeding	No. of month
			form	eaten	(%)	seen eaten
40	<i>Pothos scandens</i>	Araceae	Liana	YL	0.15	2
41	<i>Acacia pennata</i>	Leguminosae, Mimosoideae	Shrub	YL	0.10	1
42	<i>Alstonia scholaris</i>	Apocynaceae	Tree	IB	0.10	2
43	<i>Caryota mitis</i>	Palmae	Tree	FR	0.10	1
44	<i>Clitoria ternatea</i>	Leguminosae, Papilionoideae	Vine	FL	0.10	1
45	<i>Jasminum sambac</i>	Oleaceae	Shrub	ML	0.10	2
46	<i>Lagerstroemia macroura</i>	Lythraceae	Tree	FL	0.10	1
47	<i>Markhamia stipulata</i>	Bignoniaceae	Tree	FL, FR	0.10	2
48	<i>Musa sapientum</i>	Musaceae	Herb	FL	0.10	1
49	<i>Sandoricum koetjape</i>	Meliaceae	Tree	FR	0.10	1
50	<i>Solanum torvum</i>	Solanaceae	Herb	FR	0.10	1
51	<i>Trevesia palmata</i>	Araliaceae	Shrub	YL	0.10	1
52	<i>Hibiscus sabdariffa</i>	Malvaceae	Shrub	FR	0.05	1
53	<i>Pandanus amaryllifolius</i>	Padanaceae	Herb	ML	0.05	1
54	<i>Sesbania grandiflora</i>	Leguminosae, Papilionoideae	Shrub	FR	0.05	1
55	<i>Thunbergia grandiflora</i>	Acanthaceae	Liana	FL	0.05	1