A SURVEY OF CIVET CATS IN A SEMI-URBAN HABITAT IN TERENGGANU, MALAYSIA

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Abstract: Malaysia is home to 11 civet cat species. However, there is not much information regarding these viverrids, especially in semi-urban areas. Thus, a survey of civet cats was conducted in Universiti Malaysia Terengganu (UMT), a semi-urban area in one of the east coast states. UMT was chosen as it has an attractive semi-urban habitat as there are a mangrove and a beach in the area. A 30- cage trapping method was utilised in the seven-month survey, beginning September 2009 until January 2010. A total of 13 individuals of the common palm civet *(Paradoxurus hermaphroditus)* were captured, consisting of an individual male and 12 females. From the 13 individuals caught, seven were adults and the remaining
were juveniles. Banana was found to be the most preferred bait as 12 individuals (92.3%) were caught in the banana-baited trap while the salted fish bait only procured one adult female (7.7%). The study indicates that although a forest-dwelling species, the common palm civet is able to adapt to urbanization and habitat disturbance. More studies are needed to determine the common palm civet distribution, home range and population sizes in Terengganu for baseline data of the species.

Keywords: civet cats; Viverridae; *Paradoxurus hermaphroditus*, semi-urban, bait preference

Introduction

Civet cats are of the family Viverridae, which is almost similar to the ordinary cats (Azlan, 2006). In Malaysia, there are 11 species of civet cats recorded in a wide variety of habitats including forest, secondary habitats, cultivated land and outskirts of villages (Veron, 2001; Mohamad, 1992). However due to their elusive and nocturnal habits, not much is known of these viverrids.

To date, most studies on civet cats were conducted in forests, plantations and mixed forests in Borneo and the west coast states of Peninsular Malaysia (Stuebing & Gasis, 1989; Heydon & Bulloh, 1996; Colón, 1999; Syakirah *et al.* 2000). There is comparatively little published information on the status of civet cats in the east coast of Peninsular Malaysia. It is hoped that a better understanding of the present status of civets in the east coast of Peninsular Malaysia would help assess national conservation priorities and would be able to determine the prevalence of human-wildlife conflicts in the region, as eight viverrid species are listed as Totally Protected Wildlife in Malaysia under the Wildlife Conservation Act 2010 (Act 716).

This study reports the preliminary survey of civet cats conducted in Universiti Malaysia Terengganu, a semi-urban area located in Terengganu, a northern east coast state in Peninsular Malaysia by using cage-trapping method. Objectives of this study also included investigating the different bait preference of civet cats. Although bait preference plays a major role in an effective capture program to evaluate mammal communities, most studies were conducted on small mammalian communities in the temperate regions (Astúa *et al.,* 2006). It is thus hoped that this study will provide new useful information on bait preference of civet cats and methods of successful civet cat trapping in the tropics.

Materials and Methods

Study site

The study was conducted in Universiti Malaysia Terengganu (UMT) (05° 24.537'N, 103° 05.139'E). As UMT has its own mangroves and beach area, it represents an attractive semi-urban habitat to conduct the survey. In addition, Low *et al.* (1994) reported that mangroves in Indonesia serve as a habitat for several viverrid species such as the binturong (*Arctictis binturong*), yellow palm civet (*Arctogalidia trivirgata*), short-tailed mongoose (*Herpestes brachyurus*), Javan mongoose (*Herpestes javanicus*), common palm civet (*Paradoxurus hermaphroditus*) and Javan civet (*Viverricula malaccensis*).

Methods

A cage trapping method was utilized for a seven-month period beginning from September 2009 until January 2010, and each sampling effort consisted of a period of 3 days and 2 nights. A total of thirty Hoon's collapsible steel mesh traps measuring 42 x 18.5 x 18.5cm were deployed. Bananas, pineapple and salted fish were used as baits to capture the civets. Traps were set during the day near drains, buildings, and on trees where signs of civets (scat, tracks) were found.

Ripe bananas and pineapple were chosen for bait as they are non-seasonal fruits while salted fish was used due to its durability and strong smell. Additionally, Jennings *et al.* 2006 also utilised salted fish successfully as bait in their studies on the Malay civet (*Viverra tangalunga*) in Sulawesi. Traps were checked daily in the morning to collect any captured animals. To ensure that the total number of traps was maintained at 30 at all times during the study, successful traps were replenished with fresh bait at the same location after removal of the animal.

Captured animals were immobilised with chloroform, marked by nail clipping, measured and later released at point of capture. Species identification was based on Medway (1983) and Payne *et al.* (1985). From each captured individual, species, bait preference, tooth wear, overall body condition and morphological measurements such as weight, total length, measurement of tail, head-body, foot and ear, sex and age (juvenile: not full-grown, undeveloped reproductive organs, milk teeth present; adult: full-grown and mature reproductive organs such as testis, absence or presence of mammary teats) were noted. The captured civets were released when they exhibited alert and normal behaviour and reflexes (*ca* 20-30 minutes).

Results

Civets captured

Over seven consecutive sampling efforts, a total of 13 civet cats were successfully captured. Figure 1 shows the capture of individual. All trapped individuals were identified as the common palm civet or toddy cat (*Paradoxurus hermaphroditus*). Females formed the majority of capture with 12 females (92.3 %) and only one male (7.7 %). The ratio of adult to juvenile was 1:0.86 with seven adults and six juveniles captured. From the 12 females, 6 were adults and the remaining were juveniles, forming a ratio of 1:1.
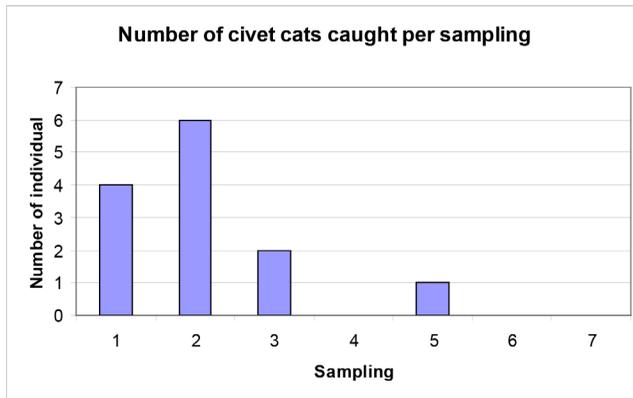
Figure 1: Number of common palm civet (*Paradoxurus hermaphroditus*) individuals captured per sampling

Table 1 shows the physical measurements of captured civets. All individuals weighed between 0.76 and 2.08 kg and appeared to be in good health with no signs of malnutrition, ectoparasites or unusual skin condition, except for 3 individuals (one male, two females: one adult and one juvenile) which exhibited signs of scabies and fur loss.

Table 1: Physical measurements of captured civets from Universiti Malaysia Terengganu (UMT)

Ind.	Sex	Age	Weight (kg)	Body measurements (cm)						
				T	HB	TL	EL	RHF	HL	FL
1	Female	Juvenile	0.86	76	37	39	4	10	12	8
2	Female	Adult	1.11	91	45	46	4.5	15	16.5	8
3	Female	Juvenile	0.84	75	36	39	4	10	12	8
4	Female	Adult	1.21	89	46	43	4.5	15	17.5	8.5
5	Female	Juvenile	0.84	83	44	39	4	14	17	8
6	Female	Adult	1.29	107	53.5	43.5	4.5	16	24	8.5
7	Male	Adult	1.15	90	46	44	4.5	15.5	18	8
8	Female	Juvenile	1.21	88	41	47	4.5	15.5	19.5	8
9	Female	Juvenile	1.28	88	43.5	44.5	4.5	15	19.5	7.5
10	Female	Juvenile	0.76	78	51	37	4	13.5	16.5	6.5
11	Female	Adult	1.63	945	48.5	46	5	15	19	8
12	Female	Adult	1.9	105	64.5	50.5	6	16	15	9
13	Female	Adult	2.08	930	50	43	5	15.5	17	8.5

Legend

T	total length
HB	head and body length
TL	tail length
EL	ear length

RHF	right hindfoot length
HL	hind length
FL	foot length

Bait preference

Banana was found to be the preferred bait of *P. hermaphroditus* as 12 individuals (92.3%) of overall capture were caught in a banana baited trap whereas only 1 individual (7.7%) was caught with the salted fish bait (Table 2). From 12 individuals caught in the banana baited trap, there were 6 adults (50%) while the remaining were juveniles. However, no civet cats were captured using pineapple as bait.

Table 2: Bait preferences according to the age of the common palm civet (*Paradoxurus hermaphroditus*) captured

Bait	Age		Total
	Adult	Juvenile	
Banana	6	6	12
Pineapple	-	-	
Salted fish	1	-	1
Total	7	6	13

Discussion

In this study, only the common palm civet *(P. hermaphroditus)* was recorded in the semi-urban habitat of UMT. Throughout the study, twelve *P. hermaphroditus* individuals were captured from September until October 2009, whereas only one individual was captured during the monsoon season, from November 2009 to January 2010. The second sampling (11 to 14 September 2009) recorded the highest number of captured civets with six individuals, followed by the first sampling (3 to 5 September 2009) with four individuals, two individuals in the third sampling (11 to 17 October 2009) and lastly, one individual in the fifth sampling (9 to 12 December 2010). However, there were no civets captured for the fourth (31 October to 3 November 2009), sixth (31 December 2009 to 3 January 2010) and seventh (29 to 31 January 2010) samplings.

The capture rate of *P. hermaphroditus* could be influenced by its seasonal activity. As a strictly nocturnal animal, its activity begins at 1800 hour and ended at 0400 hour (Anup *et al*., 1995). According to Chetana and Ganesh (2007), in their study conducted in the dry deciduous forest of Karnataka, India; *P. hermaphroditus* recorded a distinct difference in activity patterns where it is only active in the morning during the winter season which occurs in January. Thus, due to the cold wet monsoon season, food foraging activities of the civet may have been reduced, which in turn influences the low rate of capture.

In this study, there were no marked civets recaptured. Although only nail clipping was used to mark the captured civets, they could be reliably identified as different individuals. Previous studies (Ratnam *et al*. 1995 and Jennings *et al*. 2006) reported that civets had not been caught more than once in the same trap or neighbouring traps. We surmised that

this could be due to the odour released by *P. hermaphroditus* to locate their territory and food range, thus becoming trap-shy if they were caught once.

Although *P. hermaphroditus* is recorded as having a diet of fruits, leaves, arthropods, worms and mollusks (Francis 2008), *P. hermaphroditus* in this study was found to prefer bananas compared to other baits such as pineapple and salted fish. In addition, there were 5 non-civet cat individuals captured during the sampling period with various baits. These included a domestic cat (*Felix domesticus*) captured in a salted fish baited trap and 2 black rats (*Rattus rattus*) in a banana and pineapple baited trap respectively. In addition, one individual of Malayan field rat (*Rattus tiomanicus*) was captured in a pineapple trap and one individual coloured kingfisher (*Halcyon chloris*) was caught in a banana baited trap.

According to Beer (1964) and Patric (1970), baits used might influence composition and abundance of captured small mammals in the temperate regions. Additionally, Astúa *et al.* (2006) reported different results on the effectiveness of several baits for small mammals. In a disturbed area such as in UMT, various aspects should be considered in deciding on the type of bait to be used, besides the fact that animals are more attracted to baits that resemble their preferred diet (Laurance 1992). Voss and Emmons (1996) reported that weather conditions, durability, availability locally, and insect attacks such as ants should be taken into account when choosing the bait.

Conclusion

In this study, only one species of civet cat namely the common palm civet (*Paradoxurus hermaphroditus*) was captured in Universiti Malaysia Terengganu, and thus this species will be recorded in the checklist of civet cats in a semi-urban habitat on the east coast of Peninsular Malaysia. As for bait preference, *P. hermaphroditus* was found to prefer bananas over other baits such as pineapple and salted

fish. The results of this study confirm that the common palm civet or *P. hermaphroditus* is an adaptable species that is able to thrive despite factors such as urbanization and habitat disturbance. It is strongly recommended that follow-up studies be conducted on the home range, population size and distribution of this civet cat in Terengganu to establish baseline data on the species.

Acknowledgements

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