Wildlife Hunting Practices by the Indigenous People of Terengganu, Peninsular Malaysia

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Abstract In Peninsular Malaysia, the indigenous people (Orang Asli) depend on the forest for subsistence. Hunting wildlife and collecting forest products are part of their cultural practices and lifestyle. However, little is known about how the Orang Asli hunt wildlife. As such, it is important to monitor the wildlife hunting patterns of the Orang Asli to safeguard natural resources and help in animal conservation. Using both qualitative and quantitative methods, we investigated how wildlife is perceived by the Orang Asli and the traditional hunting practices of the Semoq Beri sub-tribe at a forest reserve in the state of Terengganu, Malaysia. We found that 53 wildlife species are hunted by the Orang Asli for various purposes. They tracked the animals by their footprints and used snares, traps and blowpipes to capture them. It was also noted that they do not hunt big animals, but the lucrative wildlife market has encouraged them to hunt small protected animals for better income. The findings of this study may be important to help sustain the natural resources in the forest for the Orang Asli.

Keywords Orang Asli · Wildlife hunting · Cultural practices · Sustainability

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Introduction

In Peninsular Malaysia, the indigenous people are a minority known as the Orang Asli. They are made up of three major tribes (Negrito, Senoi and Proto-Malay) divided into 18 sub-tribes (Carey 1976), and their history may be traced back to at least 25,000 years (Nicholas 2000). The Orang Asli have been called the "first people" or "original people" of Malaysia. Across the peninsula, all sub-tribes partake in similar activities in their daily lives, which include hunting, foraging and gathering forest resources (Rambo 1979).

Being primarily forest-dependent people, the Orang Asli are nomadic and semi-nomadic, acquiring various resources in and around tropical forests (Kuchikura 1986). Their high dependency on forest resources and products has been widely studied, particularly among the Semoq Beri and Batek communities (Ramle et al. 2014a; Tuck-Po 1998). Historically being land-security dependent and unaccustomed to cash economies, coupled with the lack of education and intermediate technology, these are likely reasons for their high dependence on forest resources for generations. Failure to fully assimilate into contemporary economic systems has resulted in them being plagued by perennial poverty. Recently, based on the report by the United Nations Development Programme, around 34% of the Orang Asli households lived in poverty (Balakrishnan 2016). Previous studies on forest resource utilisation by the Orang Asli have been conducted in the west coast of Peninsular Malaysia involving the Jah Hut, Semelai, Lanoh, Temiar, Temuan and Semang sub-tribes (Yahaya 2015; Milow et al. 2013; Azliza et al. 2012; Ong et al. 2012a, b; Howell et al. 2010; Samuel et al. 2010). However, hardly any study has documented Orang Asli communities living in the east coast. The sub-tribes mainly found in east coast states of Pahang, Kelantan and Terengganu are the Semoq Beri and Batek.

Based on what we know on the resources used by the Orang Asli, they harvested a variety of non-timber forest products (NTFPs) from terrestrial and aquatic sources (Arnold and Ruiz 1996). According to Burkill (1935), the Malayan rainforest contained more than 1700 species of plants and animals that have more than 5000 uses. Examples of NTFPs harvested in Peninsular Malaysia include agarwood, rattan, honey, bamboo, fruits and a variety of herbs, besides bushmeat like deer, porcupine and wild boar. Apart from using NTFPs for medicinal purposes, the Orang Asli also heavily relied on them for subsistence and materials for building their houses. In recent times, the Orang Asli have begun to harvest NTFPs in exchange for cash to purchase daily necessities. For instance, Jah Hut communities derived income from selling NTFPs, such as bamboo, fruits, vegetables, rattan and agarwood (Howell et al. 2010). In addition, NTFPs are increasingly being used by the Orang Asli as ornaments, like chenille plants (*Acalypha hispida*) and ferns (*Asparagus africanus*) (Milow et al. 2013).

The Orang Asli use a number of plant species for medicinal purposes. Recent ethnobotanical studies in Peninsular Malaysia indicated that the Orang Asli utilised more than 200 plants to treat illnesses, such as hypertension, diabetes, stomachache, diarrhoea and fever (Azliza et al. 2012; Ong et al. 2012a, b; Samuel et al. 2010;

Howell et al. 2010). The most common plants include petai (*Parkia speciosa*), tongkat ali (*Eurycoma longifolia*) and agarwood (*Aquilaria malaccensis*). The Orang Asli also use animals for a variety of purposes. However, only a few studies have documented the use of animals by the Orang Asli. At least 12 species of animals have been utilised for medicinal purposes (Yahaya 2015; Azliza et al. 2012; Howell et al. 2010). In Sarawak, however, up to 52 species of animals are utilised by the indigenous people for medicinal purposes (Azlan and Faisal 2006). Species regarded to have medicinal value by the indigenous people of Malaysia, including the peninsular Orang Asli, are the reticulated python (*Python reticulatus*), Malayan porcupine (*Hystrix brachyura*) and black giant squirrel (*Ratufa bicolor*). At least 10 terrestrial and aquatic animal taxa are consumed by the Orang Asli of the peninsula: the river terrapin (*Batagur baska*), tortoise (*Testudo* spp.), monitor lizards (*Varanus* spp.), Malayan porcupine (*Hystrix brachyura*), Sunda pangolin (*Manis javanica*), wild pig (*Sus scrofa*), macaques (*Macaca* spp.), barking deer (*Muntiacus muntjak*), plaintain squirrel (*Callosciurus notatus*) and mousedeers (*Tragulus* spp.). In some Orang Asli communities, animals are commercially traded or kept as pets (Yahaya 2015; Howell et al. 2010). Unfortunately, some animal species utilised by the Orang Asli (e.g. the Sunda pangolin) are considered critically endangered in the IUCN Red List (IUCN 2016) and are totally protected under the Malaysian Wildlife Conservation Act (2010).

Traditionally, the Orang Asli communities are known to exploit natural resources to sustain their livelihood. Today, many of the communities have been resettled in villages outside forests. Under the Sixth Schedule of the Wildlife Conservation Act (2010), the Orang Asli are permitted to hunt 10 species of wildlife for their own consumption. Nevertheless, there is a lack of information on the present state of wildlife being hunted by the Orang Asli and their hunting practices.

The Semoq Beri was chosen in this study because previous studies of this subtribe have only explored their concept of the forest and traditional knowledge (Ramle et al. 2014a, b), but did not look into their hunting practices. This has important implications for the conservation of threatened wildlife species. Therefore, by using qualitative and quantitative methods, we aim to: (1) determine the animals hunted by the Semoq Beri people living in the east coast of Peninsular Malaysia, (2) elucidate their hunting practices and (3) identify the favourite mammals hunted by this sub-tribe.

Methods

In a period of 6 months (between August 2015 to January 2016), information was gathered on the wildlife perceived and hunted by the Orang Asli in Kampung Sungai Berua (5° 4′ 49.8″ N 102° 53′ 2.76″ E) in Kenyir, Terengganu (Fig. 1). The majority of the Orang Asli people in the village belonged to the Semoq Beri sub-tribe. Ethic approval was obtained from the Orang Asli Development Department (JAKOA) of the Rural Development Ministry, and consent was requested from the village head.

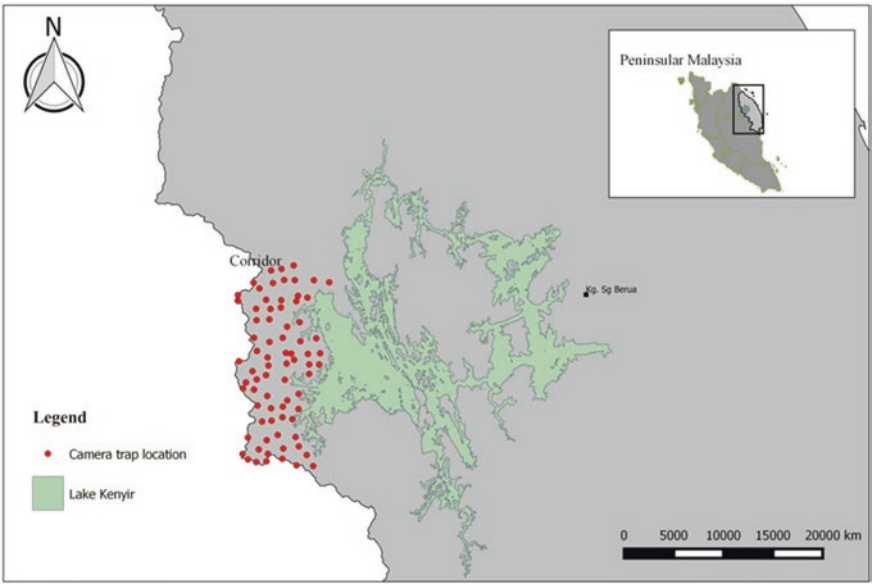

Fig. 1 Map showing the Orang Asli settlements in Kenyir, Terengganu, and locations of camera traps within the Kenyir forest reserve

Qualitative approach using face-to-face interviews was conducted on key informants comprising traditional medicine practitioners and hunters. Wildlife observed during the survey was photographed for *in-situ* identification purposes according to Francis (2008) for mammals, Robson (2000) for birds and Indraneil (2010) for reptiles. A series of questionnaires were employed to determine the wildlife hunted by the Semoq Beri folk.

Relatively abundant data on mammals in Kenyir Forest Reserve (Fig. 1) was collected from April to November (eight months). In order to obtain mammal detection/non-detection data, 78 camera traps were fixed on metal poles (in the absence of trees) that were cemented to the ground. Camera traps were installed close to underpass columns to prevent mammals from passing behind the camera. The surrounding vegetation was cleared to provide optimal fields of detection for each camera trap. Camera traps were checked to retrieve data and replace the batteries every two months. The relative abundance of mammal species was defined using the Photographic Capture Rate Index (PCRI). The estimates were averaged across all camera placements within each study area to produce respective mean PCRIs. Independent photos were defined as photos being captured 30 minutes apart from a previous photo with the next at the same location.

Results

Our findings identified 53 animal species utilised by the Semoq Beri Orang Asli as shown in Table 1. The animals comprised 10 species of reptiles, nine birds and 34 mammals. All reptiles and birds had been hunted by the Semoq Beri in the last 12 months. However, for mammals, 14 species including the sun bear, Malayan tiger, Asian elephant and tapir were not hunted. This was because the natives only utilised animals that provided significantly for their livelihood. Among all the identified wildlife game, four species were critically endangered: the river terrapin (*Batagur affinis*), red-eared slider (*Trachemys scripta*), helmeted hornbill (*Rhinoplax vigil*) and Sunda pangolin (*Manis javanica*). Additionally, there were seven endangered species, 12 vulnerable species and six near threatened species (Table 1).

Camera traps captured a relative abundance of 10 large mammals using the viaducts over 6 months (Table 2). The relative abundance, a PCRI for all large mammals, were defined as the number of independent photos (detections) captured. These estimates were averaged across all camera placements within each study area to produce respective mean PCRIs. Many of the large mammals observed were herbivores and omnivores. Carnivores were relatively rare.

Discussion

In Southeast Asia, indigenous communities had been hunting wildlife mainly for subsistence for at least 40,000 years (Zuraina 1982). In Peninsular Malaysia, the Orang Asli were known to hunt and utilise various species, including endangered ones. Wildlife hunting was considered an important subsistence activity for Orang Asli communities. Regarded as forest people, the Orang Asli could hunt animals easily using traditional knowledge and methods.

Among all the species, 53% were used for household consumption while 40% were utilised for trading and 26% were kept as pets. Besides that, the Orang Asli still relied on animals for medicinal purposes (8%). The parts of a few species were used for traditional treatment, such as pangolin scales and meat, the hornbill's casque and porcupine bezoars (onion-shaped masses of undigested plant material in the animal's gut). This finding was supported by a previous study conducted on a similar sub-tribe (Bartholomew et al. 2016).

For data validation, information on actual wildlife had been documented based on secondary data. Table 2 shows the taxonomic list of mammals recorded in the Kenyir forest area. Besides that, data of animals present in Kenyir forest area were also obtained from previous studies (Yong 2015; Clements 2013; Hedges et al. 2013). There were around 44 species of mammals, one of which was critically endangered, six endangered, nine vulnerable and six near threatened under the IUCN Red List (2016). The animals were also categorised as totally protected (64%) or protected (36%) under the Malaysian Wildlife Conservation Act (2010).

Table 1 Wildlife hunted by the Orang Asli in the last 12 months

Species	Scientific name	Common name	Orang Asli name	Uses	WCA (2010)	IUCN status
Reptiles	**Geoemydidae**					
	Batagur affinis	River terrapin	*Pa′ as*	F, P, T	TP	CR
	Cuora amboinensis	Malayan box turtle	*Kerak keban*	F, P	P	VU
	Heosemys spinosa	Spiny hill turtle	*Ga′ de*	T	P	EN
	Siebenrockiella crassicollis	Black marsh turtle	*Yo*	F, M, T	P	VU
	Manouria emys	Asian brown tortoise	*Sel*	P, T	P	VU
	Emydidae					
	Trachemys scripta	Red-eared slider	*Mong*	M, T	NE	CR
	Trionychidae					
	Amyda cartilaginea	Asiatic softshell turtle	*Pa′ as*	T	P	VU
	Gekkonidae					
	Gekko gecko	Tokay gecko	*Che' eh*	T	P	NA
	Varanidae					
	Varanus salvator	Monitor lizard	*Sereng*	F	P	LC
	Pythonidae					
	Python reticulatus	Reticulated python	*Tijo*	M, T	P	NA
Birds	**Phasianidae**					
	Lophura ignita	Crested fireback	*Kawah pegar*	F, P	TP	NT
	Gallus gallus	Junglefowl	*Ayam hutan*	F, P	P	LC
	Rallidae					
	Amaurornis phoenicurus	Waterhen	*Itik air*	F	P	NT
	Bucerotidae					
	Rhinoplax vigil	Helmeted hornbill	*Burung lilin*	F, M, T	TP	CR
	Buceros rhinoceros	Rhinoceros hornbill	*Terang*	F, T	TP	NT
	Columbidae					
	Chalcophaps indica	Emerald dove	*Kawah kukur*	F, P	P	LC
	Psittaculidae					
	Psittinus cyanurus	Blue-rumped parrot	*Kawah serindit*	P, T	TP	NT

(continued)

Table 1 (continued)

Species	Scientific name	Common name	Orang Asli name	Uses	WCA (2010)	IUCN status
	Sturnidae					
	Gracula religiosa	Common hill myna	*Kawah tiong*	F, P, T	P	LC
	Passeriformes					
	Pycnonotus zeylanicus	Straw-headed bulbul	*Kawah barau*	F	TP	VU
Mammals	**Manidae**					
	Manis javanica	Pangolin	*Pantuai*	F, T	TP	CR
	Cynocephalidae					
	Galeopterus variegates	Sunda colugo	*Kubung*	NA	TP	LC
	Lorisidae					
	Nycticebus coucang	Slow Loris	*Relung*	NA	TP	VU
	Cercopithecidae					
	Trachypithecus obscurus	Dusky leaf monkey	*Basing*	F, T	P	NT
	Macaca nemestrina	Southern pig-tailed macaque	*Tadik*	F, T	P	VU
	Macaca fascicularis	Long-tailed macaque	*Penrok*	F T	P	LC
	Hylobatidae					
	Symphalangus syndactylus	Siamang	*Batiu*	NA	TP	EN
	Hylobates lar	White-handed gibbon	*Tawo*	NA	TP	EN
	Canidae					
	Cuon alpines	Dhole	*Cho*	NA	TP	EN
	Ursidae					
	Helarctos malayanus	Sun bear	*Mol*	NA	TP	VU
	Mustelidae					
	Martes flavigula	Yellow-throated marten	*Sawot*	NA	TP	LC
	Aonyx cinerea	Oriental small-clawed otter	*Memerang*	NA	TP	VU
	Viverridae					
	Viverra tangalunga	Malayan civet	*Musang*	F, T	P	LC
	Paradoxurus hermaphroditus	Common palm civet	*Musang*	F, T	NE	LC
	Felidae					
	Panthera tigris	Tiger	*Gayi*	NA	TP	EN
	Panthera pardus	Leopard	*Gayi*	NA	TP	VU

(continued)

Table 1 (continued)

Species	Scientific name	Common name	Orang Asli name	Uses	WCA (2010)	IUCN status
	Neofelis nebulosa	Clouded leopard	*Gayi*	NA	TP	VU
	Elephantidae					
	Elephas maximus	Asian elephant	*Gajah*	NA	TP	EN
	Tapiridae					
	Tapirus indicus	Asian tapir	*Badak kampung*	NA	TP	EN
	Suidae					
	Sus scrofa	Bearded pig	*Jalu*	F	TP	LC
	Tragulidae					
	Tragulus spp.	Mousedeer	*Kancil*	F	P	LC
	Cervidae					
	Rusa unicolor	Sambar deer	*Pelanduk*	F	P	VU
	Muntiacus muntjak	Barking deer	*Bohol*	F	P	LC
	Bovidae					
	Capricornis sumatrensis	Southern serow	*Kambing gurun*	M	TP	NA
	Sciuridae					
	Callosciurus notatus	Plantain squirrel	*Cedek*	F, P, M	NE	LC
	Callosciurus erythraeus	Pallas's squirrel	*Lebir*	F, P	NE	LC
	Callosciurus caniceps	Grey-bellied squirrel	*Gahui*	F, P	NE	LC
	Ratufa bicolor	Black giant squirrel	*Daguan*	NA	TP	NT
	Sciuridae					
	Petaurista petaurista	Red giant flying squirrel	*Menuk*	P	TP	LC
	Petaurista elegans	Lesser giant flying squirrel	*Pawor*	P	TP	LC
	Aeromys tephromelas	Black giant flying squirrel	*Pati*	P	TP	DD
	Spalacidae					
	Rhizomys sumatrensis	Hoary bamboo rat	*De' kan*	F, T	NE	LC
	Hystricidae					
	Hystrix brachyura	Porcupine	Landak	F, M, T	P	LC
	Atherurus macrourus	Brush-tailed porcupine	Landak	F, M, T	P	LC

Uses: (*F* = Food; *P* = Pet; *M* = Medicine; *T* = Trading; *NA* = Not Available); (*TP* = Totally Protected; *P* = Protected; *NE* = Not Evaluated); (IUCN Red List Status 2016: *CR* = Critically Endangered; *EN* = Endangered; *VU*=Vulnerable; *NT* = Near Threatened; *LC* = Least Concern; *NA* = Not Available; *DD* = Data Deficient

Table 2 Summary statistics of 10 mammal species expected to occur at viaducts in Tembat Forest Reserve

Diet	Common name	Species	N	PCRI	IUCN
H	Muntjac	*Muntiacus muntjac*	91	17.01	LC
H	Asian tapir	*Tapirus indicus*	48	8.98	EN
O	Wild pig	*Sus scrofa*	14	2.62	LC
H	Asian elephant	*Elephas maximus*	12	2.24	EN
O	Sun bear	*Helarctos malayanus*	2	0.374	VU
C	Banded linsang	*Prionodon linsang*	1	0.187	LC
O	Long-tailed macaque	*Macaca fascicularis*	1	0.187	LC
O	Pig-tailed macaque	*Macaca nemestrina*	1	0.187	VU
O	Yellow throated marten	*Martes flavigula*	1	0.187	LC
C	Leopard cat	*Prionailurus bengalensis*	1	0.187	LC

Diet = herbivorous (H), omnivorous (O), carnivorous (C). N = independent detections (0.5 hr. intervals); *PCRI* = Photographic Capture Rate Index (N/1000*trap nights). *IUCN status checked via iucnredlist.org website

The respondents reported hunting at least 11 of the 42 mammals sighted in the forest reserve (26%). According to the interviews, the Semoq Beri basically caught the animals using snares (89%) and blowpipes (73%). For instance, bigger animals such as wild boars, sambar deers and barking deers were hunted using blowpipes, but sometimes, they were also caught in snares. For birds, the Orang Asli mainly used traps to hunt them. Most of the birds were eaten while a few species, such as the blue-rumped parrot (*Psittinus cyanurus*) and common hill myna (*Gracula religiosa*), were kept as pets because of their aesthetic features. Other species, such as turtles and tortoises, were captured using bare hands. These species are used for food, trading and, in some cases, for traditional medicine (e.g. red-eared slider). According to some interview respondents, the Orang Asli communities hunted wildlife based on traits of the particular animals. For instance, they will go out and hunt nocturnal animals at night. They preferred to hunt during the rainy season because it was easier to track the animals' footprints on the wet ground.

The hunting practices of the Orang Asli was highly related to their culture and belief. For instance, the certain communities did not hunt snakes because of cultural restrictions or taboos that prohibited its consumption (Endicott 2010). With a large number of the Orang Asli adopting Islam as their religion, they had also forgone the consumption of wild pigs or animals that were not considered halal. But although the Orang Asli communities in Kampung Sungai Berua had converted to Islam, some of them still hunted wild boars to sell for subsistence.

The Orang Asli practices were strongly related to their belief in spirits that guided their lives, and those practices could actually allow them to hunt wildlife in a sustainable manner. For instance, the Semoq Beri communities strongly believed in their *Semoq Hala* (Ramle et al. 2014a), which were spirits that they obeyed. In relation to that, their concept of the forest and its significance, particularly to the Semoq Beri in Terengganu, had been documented (Ramle et al. 2014b). The Semoq Beri community considered themselves responsible for safeguarding the forests

around them. They believed that supernatural beings dwelled in the forests and they were responsible for providing and protecting all its resources. As such, the Orang Asli traditionally believed that forest resources must be extracted with a purpose (Hood 1995). The forest was considered as their "bank", where they could withdraw its wealth when needed, and in a sustainable manner to avoid wastage. The resources must be carefully managed so that the next generation would also be able to make use of the wealth (Ramle et al. 2014b). Several taboos in forest resource harvesting were adhered to by the Orang Asli. For instance, permission or consent must be requested from supernatural beings prior to exploiting any plant or animal for their subsistence. They believed that failure to do so would incur the wrath of the forest spirits, which would lead to punitive consequences befalling their community, such as disease and natural disasters. Wildlife was an important forest resource that contributed to the well-being of the Orang Asli. In this study, we documented that the Orang Asli had utilised wildlife for both consumptive (74%) and non-consumptive (26%) purposes. Similarly in Sabah and Sarawak, the hunting of wildlife by the natives there was also observed to be largely for household food consumption (Azlan and Faisal 2006). This indicated that wildlife played an important role in sustaining the Orang Asli life.

Nevertheless, deforestation, complicated by poaching and lack of legal and positive economic incentives, were main threats to the livelihood of the people that relied on forest resources, including the Orang Asli (Milner-Gulland 2012). The Orang Asli's livelihood was very vulnerable to developments that encroached on the forests where they used to hunt and earn their living. Based on interviews, the Semoq Beri respondents claimed that animals were increasingly hard to hunt and that they had to spend more time and go deeper into the forest. This could be attributed to the decline in animal populations caused by the loss of habitat due to the high rate of deforestation in nearby Orang Asli settlements. Historically, Orang Asli populations occupying vast acreages of forest had a negligible impact on wildlife. Permanent settlements with limited forests, coupled with the lack of sustainable economic opportunities, had changed the lifestyle of the Orang Asli for the worse and increased their burden. Additionally, poaching by locals and foreigners had been reported in the forests of Peninsular Malaysia (Loh 2016). The threat of paoching had become severe when the Wildlife and National Parks Department (PERHILITAN) reported large hauls of wildlife parts being seized from foreign poachers between 2010 and 2015, all of which had been obtained from protected areas in Terengganu (Fig. 2).

The Orang Asli did not hunt big game animals such as the Asian elephant, but there were cases where locals and foreigners had been detained for killing the elephants (Dasgupta 2017). In Tasik Pedu, Kedah, an elephant carcass was found two weeks after it was belived to have been killed by poachers for its tusks (Anon 2016). In Borneo, two rare elephants were also killed for their tusks (Anon 2017). Meanwhile, the critically endangered Malayan tiger was reportedly in grave danger due to illegal hunting for its meat and body parts (Rosli 2016; Zarina 2016). The Orang Asli were hardly involved in poaching cases. However, there were incidents where they had been used as guides and paid to hunt smaller protected animals

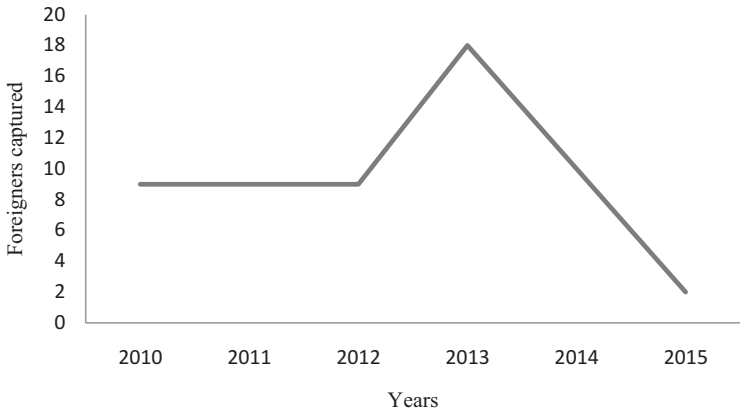

Fig. 2 Number of poaching cases by foreigners in Taman Negara (PERHILITAN 2016)

(Anon 2011; Yeng 2010). As noted, one of the main reasons that drove the Orang Asli to get involved in poaching was the good money paid by buyers, which could alleviate the burden of supporting their families (Azrina et al. 2011). Several studies had found a positive relationship between illegal harvesting of natural resources and poverty (Mainka and Trivedi 2002). For instance, in Palawan province in the Philippines, poverty was cited as a likely reason for hunting endangered species to sell at high prices among the rural communities there (Shively 1997).

To our knowledge, continuous hunting of protected wildlife might undermine viable populations and the overall survival of targeted species. As wildlife is one of the important components of the tropical forest ecosystem, it would be crucial to conserve and safeguard Malaysia's heritage for the future generation. Much progress had been made, with laws strictly enforced to prevent the extinction of animals. In Peninsular Malaysia, wildlife was protected under the Wildlife Conservation Act (2010), while Sabah and Sarawak had their own Wildlife Conservation Enactment (1997) and Wild Life Protection Ordinance (1998), respectively.

On the Orang Asli's right to hunt protected wildlife, the law forbade them from trading or selling animals or parts listed in the Sixth Schedule. Nevertheless, our study documented the hunting of pangolins by the orang Asli. Previous studies had addressed the involvement of the Orang Asli in poaching and trading of several species of animals, including the pangolin (Azrina et al. 2011). Historically, contact between the Orang Asli and outsiders had been established in the fifteenth century through economic activities (Gianno and Bayr 2009). Basically, Orang Asli were paid a nominal sum by commercial outfitters seeking wildlife products. The demand for wildlife products had increased over time. For example, pangolins, turtles, porcupines and pythons had lucrative value in traditional Chinese medicine (Brooks et al. 2010; Clements et al. 2010). Today, the huge market had encouraged the Orang Asli to hunt threatened or endangered species even though they knew about the wildlife protection laws. Based on personal communication, more than 50% of the respondents in this study were aware about which animal they could and could not

hunt. However, the hunting of protected animals still occurred due to lack of economic opportunities or incentives. Therefore, the low socioeconomic status of the orang Asli that led to a high illiteracy rate and lack of marketable skills had left them desperate and vulnerable (Azrina et al. 2011).

There was some disparity between the species that the Orang Asli were allowed to hunt and those that they actually hunted. For instance, even though Orang Asli communities hunted critically endangered species like the sunda pangolin and red-eared slider, they also hunted small arboreal animals like squirrels, which were not in the Sixth Schedule. According to Aziz et al. (2013), there were weaknesses in the law such as the rights given to the Orang Asli and how the animals were chosen. As such, it was important to review the law to make it more relevant and prevent the Orang Asli from getting into trouble. This was supported by previous studies on poaching by rural communities in Sarawak, which identified lax enforcement as one of the causes that encouraged the activity (Kishen et al. 2012).

Conclusion

The Orang Asli community hunted wildlife for both consumption and non-consumption purposes. The community did not cause wildlife depletion or extinction because they did not hunt in an unsustainable manner. While it was vital to conserve the survival of threatened species, efforts should be implemented to sustain the livelihood of the Orang Asli. The current findings showed that wildlife provided a significant livelihood to the Orang Asli, particularly the Semoq Beri in Kenyir, Terengganu. While they were known to hunt in a sustainable manner, more studies should be conducted to address the issue of wildlife hunting not only by the Orang Asli, but also by non-native locals. New economic opportunities for the Orang Asli, alternative incentives to reduce poaching, and maintaining suitable amounts of virgin forest together with increased law enforcement would help secure Malaysia's wildlife heritage and sustainable lifestyle of the Orang Asli.

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Apendix 1 List of mammals Recorded in Kenyir Forest (Yong 2015; Clements 2013; Hedges et al. 2013)

Family	Species	Common Name	WCA (2010)	IUCN
Manidae	*Manis javanica*	Sunda pangolin*	TP	CR
Cercopithecidae	*Presbytis siamensis*	White-thighed leaf monkey	P	NT
	Trachypithecus obscurus	Dusky leaf monkey*	P	NT
	Macaca nemestrina	Pig-tailed macaque*	P	VU
	Macaca fascicularis	Long-tailed macaque*	P	LC
Hylobatidae	*Symphalangus syndactylus*	Siamang	TP	EN
	Hylobates lar	White-handed gibbon	TP	EN
Canidae	*Cuon alpines*	Dhole	TP	EN
Ursidae	*Helarctos malayanus*	Sun bear	TP	VU
Mustellidae	*Martes flavigula*	Yellow-throated Marten	TP	LC
	Lutrogale perspicillata	Smooth-coated otter	TP	VU
	Aonyx cinereus	Oriental small-clawed otter	TP	VU
Viverridae	*Viverra zibetha*	Large Indian civet	TP	VU
	Viverra tangalunga	Malay civet*	P	LC
	Prionodon linsang	Banded linsang	TP	LC
	Paradoxurus hermaphrodites	Common palm civet	P	LC
	Paguma larvata	Masked palm civet	TP	LC
	Arctictis binturong	Binturong	TP	VU
	Arctogalidia trivirgata	Small-toothed palm civet	TP	LC
	Hemigalus derbyanus	Banded palm civet	TP	NT
Herpestidae	*Herpestes urva*	Crab-eating mongoose	TP	LC
Felidae	*Pantera tigris jacksoni*	Malayan Tiger	TP	EN
	Panthera pardus	Leopard	TP	NT
	Neofelis nebulosa	Clouded leopard	TP	VU
	Pardofelis marmorata	Marbled cat	TP	NT
	Catopuma temminckii	Golden cat	TP	NT
	Prionailurus bengalensi	Leopard cat	TP	LC
Elephantidae	*Elephas maximus*	Asian elephant	TP	EN
Tapiridae	*Tapirus indicus*	Asian tapir	TP	EN
Suidae	*Sus scrofa*	Wild pig*	P	LC
Tragulidae	*Tragulus* spp.	Mousedeer*	P	LC
	Tragulus kanchil	Lesser mouse-deer*	NA	LC
Cervidae	*Rusa unicolor*	Sambar deer*	P	VU
	Muntiacus muntjak	Barking deer*	P	LC
Bovidae	*Capricornis sumatraensis*	Serow	TP	VU

(continued)

Family	Species	Common Name	WCA (2010)	IUCN
Sciuridae	*Callosciurus prevostii*	Prevost's squirrel	TP	LC
	Callosciurus caniceps	Grey-bellied squirrel	NA	LC
	Lariscus insignis	Three-striped ground squirrel	NA	LC
Muridae	*Rattus* spp.	Rats	NA	LC
Hystricidae	*Hystrix brachyura*	Malayan porcupine*	P	LC
	Atherurus macrourus	Brush-tailed porcupine	P	LC
	Echinosorex gymnura	Moonrat	NA	LC

Note: *indicate animals being hunted by the Orang Asli

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