Small carnivores in mixed-use forest in Bintulu Division, Sarawak, Malaysia

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Abstract

Camera-trapping in the Sarawak's Planted Forests Project, Bintulu Division, supported by direct observations revealed regular usage of the exotic *Acacia mangium* plantation by Tangalung *Viverra tangalunga,* Common Palm Civet *Paradoxurus hermaphroditus* and Short-tailed Mongoose *Herpestes brachyurus*, and occasional records of most of the diverse community of small carnivores in the remaining natural forest of the project area. The rare Sunda Otter Civet *Cynogale bennettii* was recorded in natural habitats. Conversion occurred too recently to allow prediction of eventual small carnivore communities in the plantations. More information is needed on this greatly under-researched topic, given that most of the world's surface will not contain pristine natural habitats into the long term.

Keywords: acacia, adaptability, Borneo, exotic plantations, forest buffers, forest conversion

Introduction

Little field information has been published over the past 30 years on small carnivore families of Southeast Asia. In particular, there is almost no information concerning their distribution and status in forest plantations or logged forest. In February 2005, Grand Perfect Conservation began a collaborative research programme with the Conservation Research Center, Smithsonian Institution, USA, to conduct baseline surveys, using remote trip cameras, of the diversity and status of terrestrial mammals, including small carnivores, in a mixed-use forestry project. Direct observations, registration of tracks and faeces, and results from interviews with local residents were also taken into account, but were used only as supporting information because the identity of certain species of small carnivores can sometimes be misjudged using such methods (Choudhury 1997).

The Forest Department Sarawak's Planted Forests Project (the Planted Forest Zones, or PFZ; Fig. 1) is located in the Bintulu Division of Sarawak. About 40% of the area of low rolling hills will eventually be planted with *Acacia mangium*, an exotic species native to Australasia (including New Guinea). Management boundaries were established in early 2003, although planting of *A. mangium* had started in 1999, as soon as old-growth forest was cut down. Plantation had been extended to an area of approximately 38,000 ha within the PFZ by 2005, with a target of 205,000 ha by the end of 2009 (Stuebing & Wong 2005). Forested areas remaining will consist of stream buffers, swamps, steep slopes and other land unsuitable for planting, as well as shifting cultivation (including Native Customary Rights) lands. These lands will function as wildlife 'reservoirs'. Samarakan Planted Forest Zone, which covers about a third (about 60,000 ha) of the whole plantation area, consists of a majority of acacia plantation. About 10% of the zone is set aside as river buffers and wildlife corridors for biodiversity protection.

Preliminary results (February 2005–June 2006) from about 2000 camera-trap-nights (which yielded about 300 photographs of large mammals and non-volant small mammals), and the other techniques, include records of six viverrid, two herpestid and two mustelid species in the PFZ. This paper provides general notes on the distribution and status of these species, particularly in the acacia plantation. Background to the study, including fuller profile of the survey areas, the precise camera-trapping protocol, and species tallies for the first few months of camera-trapping, is given in Belden *et al*. (2007).

Species notes

Details on each photograph of each species taken are given in Belden *et al*. (2007), with the text below expanding on discussion and speculation about each species's local status.

Yellow-throated Marten *Martes flavigula*

The marten has been recorded only from the Samarakan area of the PFZ, both inside acacia plantation adjacent to the forested area and in the forested area itself. Two photos of this species were taken during daytime. No other direct observation or recent reports exist for this species from the study area.

Malay Weasel *Mustela nudipes*

Two observations of the weasel were recorded in Tubau Planted Forest Zone, both observed running across skid trails between blocks of acacia plantings. It is one of the most easily recognised small carnivores with its bright orange body contrasting with its pale whitish head (Payne *et al*. 1985), and hence the field sightings are taken as certain records. No photograph has yet been taken for this species in the PFZ, but across its range it seems to be very difficult to record in camera-traps (Duckworth *et al*. 2006). There are no reports as yet from the Samarakan area of the PFZ or any of the wildlife reservoirs. Its current status is still unclear.

Tangalung (Malay Civet) *Viverra tangalunga*

The Tangalung is the most commonly seen civet in the area, and inhabits hills, plantation adjacent to forested areas, lowland forest and riverine buffer. It was observed walking near human habitation inside the acacia plantation. This species was recorded throughout Tubau (north-east Bintulu) to Samarakan (southern part of Bintulu). Camera-trap photographs were taken mainly at night (13 photos), but with three by day. Although usually regarded as nocturnal (e.g., Payne *et al*. 1985), it is perhaps mostly crepuscular (e.g., Colón 2002, Azlan 2005), and significant day-time activity levels were reported from Buton island, off Sulawesi (Jennings *et al*. 2006).

Common Palm Civet *Paradoxurus hermaphroditus*

The Common Palm Civet is one of the two most common civets recorded, and has been observed in mainly at night with a few photos by day. The so-called 'toddy cat' seems to adapt well to disturbed environments such as the acacia plantation, as it was often recorded within acacia blocks although these were within 300–400 m from natural forest. This species is frequently taken by

local hunters for food or as a pet; however this is not obviously affecting wild populations because most local hunters, particularly in Sarawak, prefer to hunt bigger animals due to difficulty and cost of obtaining bullets (M. Nyegang personal observation).

Binturong *Arctictis binturong*
The Binturong was not commonly recorded by camera traps, perhaps due to its largely arboreal behaviour. One photo of this species was taken from disturbed forest surrounded by acacia plantation. One living animal was confiscated by the camp manager from his workers and was released straight away into the conservation area. It is evidently sometimes mistaken with young Sun Bear *Helarctos malayanus* by non-specialists, and still no recent records or reports have been collected inside acacia plantation. Its current status remains unclear.

Small-toothed Palm Civet *Arctogalidia trivirgata*
One live Small-toothed Palm Civet from Binyo-Penyilam Conservation Area (peat swamp 'lakes' and lowland *kerangas* forest), south-east Bintulu, treated as a pet by local people was observed. Three individuals were captive in Taman Tumbina (Flora and Fauna Park) in Bintulu division (G. Belden personal observation). No camera-trap photo has been taken of this species in the PFZ, reflecting the difficulty to detect it by ground-level camera-trapping due to its arboreal behaviour (e.g., Walston & Duckworth 2003, Holden 2006). It is impossible to tell whether it might adapt to the radical environment changes of the acacia plantation. Hunters in the plantation area (although not necessarily elsewhere in Sarawak) prefer Small-toothed over Common Palm Civet for food and as pets, and some use illegally-obtained bullets, which are cheap, so they do not need to think about their cost so much. Even so, it seems to be still common in the Tubau planted forest zone. For example, ten were seen in two hour's spotlighting one night in early 2007 (G. Belden, personal observation).

Sunda Otter Civet *Cynogale bennettii*
This semi-aquatic civet is probably the rarest of all viverrids yet found in the PFZ, and perhaps in Borneo. Little information is available regarding its status and behaviour (Veron *et al*. 2006). One photo of this species was taken in March 2005 from Bukit Sarang Conservation area (south-west Bintulu), an area covered by freshwater swamp forest combined with a limestone hill forest which serves as a wildlife reservoir. A recent direct observation (at approx. 6 metres range) in the same area (B. Lardner personal communication to Veron *et al*. 2006) also confirmed this species in the area. Further study to assess this species's local status is underway.

Short-tailed Mongoose *Herpestes brachyurus*
Of the three species of mongooses found in Borneo, the records of short-tailed animals are assumed to relate to Short-tailed Mongoose rather than the morphologically very similar Hose's Mongoose *H. hosei*, which differs mainly by skull characters (Payne *et al*. 1985). Short-tailed Mongoose appears to be relatively common

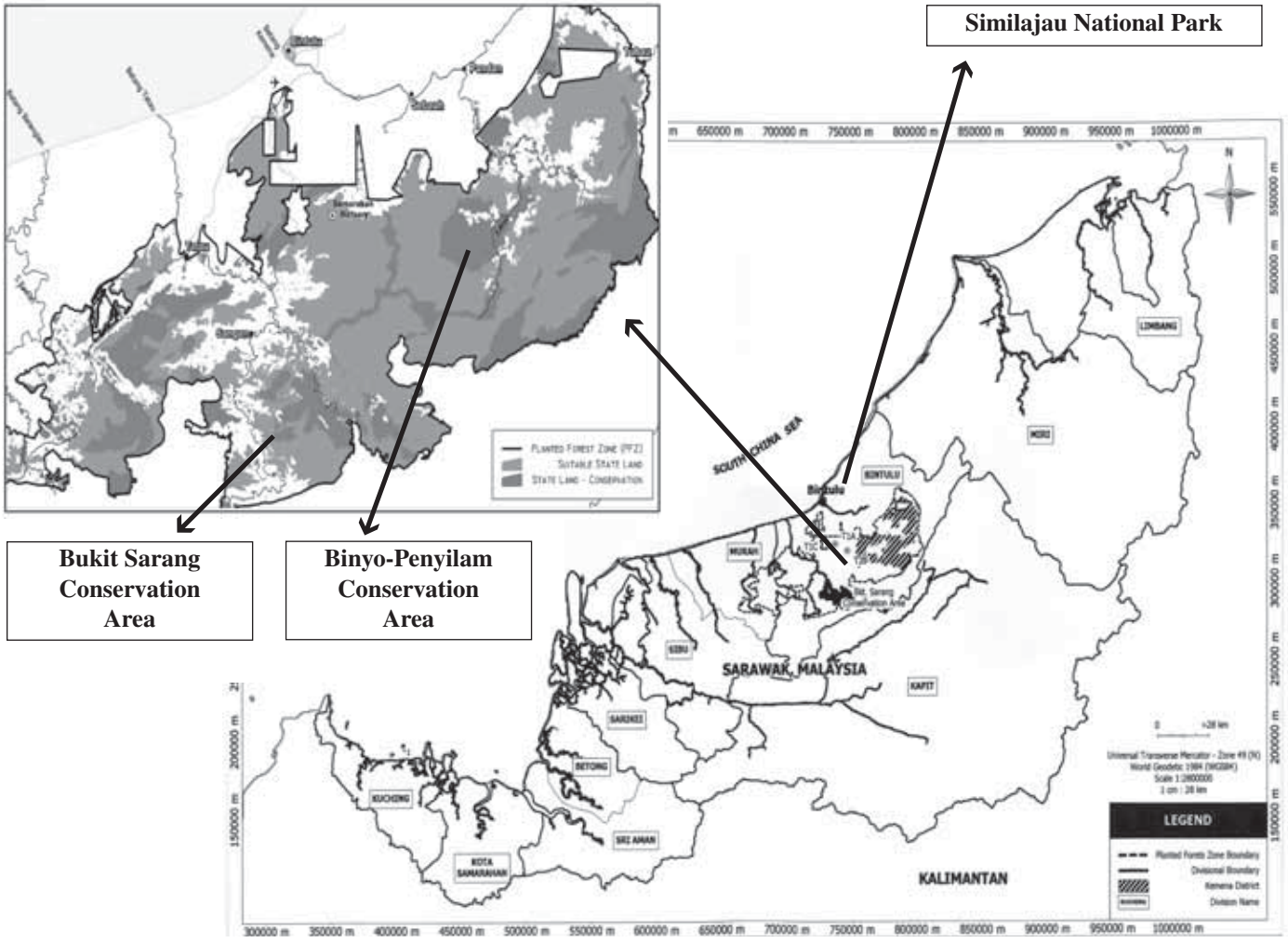

Fig. 1. Map of Sarawak Planted Forest (Pulp & Paper) Project, Bintulu Division, Sarawak, Malaysia.

in acacia plantings and has been recorded in forested areas as well. Sometimes it can be seen being chased by dogs as it seems to be frequently found near human settlements. It has been recorded equally by day and by night in acacia plantings. One pair of mongooses was seen walking across the main road near the Samarakan nursery. It is not a species hunted by local people.

Collared Mongoose *Herpestes semitorquatus*
The only observations from the PFZ are a single clear photo from an acacia plantation in August 2006, and a lone observation of an individual running quickly across the main road leading to the Samarakan plantation area in early 2006. Since this species can be confused with Short-tailed Mongoose, information from interviews is unreliable. The current status of *H. semitorquatus* in the PFZ remains unclear, and indeed little is known about its natural history. Future assessments will be conducted to obtain anecdotal information regarding its patchy distribution in such plantations.

Discussion

Few recent studies have focussed on the ecology and conservation status of small carnivores, particularly in plantations or other areas where habitat has been seriously disturbed (e.g., Azlan 2003). Most research has been directed at large carnivores and game species, and was carried out in areas of primary or relatively little-disturbed forests. The Bintulu PFZ is a study area which can reveal the impacts of land conversion and the types of conservation measures that need to be applied to ensure long-term survival of the small carnivore fauna. As noted above, the local conservation status of species including *Cynogale bennettii*, *Herpestes semitorquatus*, *Mustela nudipes*, *Arctogalidia trivirgata* and *Arctictis binturong* is still not clear. In the PFZ, planting of *Acacia mangium* will have been extended substantially, with a target of 205,000 ha, by the end of 2009. This will certainly influence species abundance and possibly affect population persistence. It may be a particular problem for those which seem to occupy mature habitats, especially *Cynogale bennettii* and *Arctictis binturong*.

Based on current results, silvicultural habitats may be found to support high numbers of certain small carnivores. *Viverra tangalunga, Paradoxurus hermaphroditus* and *Herpestes brachyurus* all tolerate or even reside in acacia plantations, despite the seemingly radical differences between acacia and natural forest. Nevertheless, establishment of additional 'reservoirs' or wildlife corridors should be considered to minimise the potential of local population reductions or losses. Also, the current status of each of these species needs to be interpreted cautiously for two reasons. Firstly, the habitat conversion took place relatively recently, and it may take some years for populations to reach a new equilibrium (which might be local extinction) following such disturbance (Tilman *et al*. 1994). Secondly, the old-growth forest remaining nearby could serve as a source for a resident population in the artificial habitats, or supply transient animals during dispersal. A deeper understanding of small carnivore population dynamics in acacia plantations and other highly disrupted habitats is needed.

Natural forests continue to be to converted to plantations. Clearly, it is important to continue to work towards conserving small carnivore diversity in plantation landscapes. Careful assessments of original densities and abundance of each species, as well as long-term monitoring are fundamental to success in such conservation programmes. The more we know the more we will be able proceed towards effective conservation management.

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