Investigating the role of small carnivores in controlling rodent populations in oil palm plantations in Indonesia

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A research program dealing with conservation and production

The issue of biodiversity within and around oil palm plantations is important not only from the conservation viewpoint, but also for integrated pest management.

Leopard cat
Prionailurus bengalensis.

A research program has been initiated by CIRAD, SMARTRI and UFC/CNRS, in collaboration with LIPI (Indonesian Institute of Sciences), CBGP (Center for Biology and Management of Populations, France) and MNHN (Muséum National d'Histoire Naturelle, France). We hope that it will provide an insight into how much small carnivores help to control oil palm pests and how they can be maintained and enhanced within the oil palm landscape.

Small-toothed palm civet
Arctogalidia trivirgata.

Background and objectives

Rodents population outbreaks can cause significant damage to oil palm production (Wood and Liau, 1984). Rodent control is generally based on field treatment using rodenticide chemicals and/or on the enforcement of Barn Owl (Tyto alba) populations. The efficacy of Barn Owls in controlling rodent populations varies between different oil palm landscapes. Moreover, anticoagulant rodenticides can induce secondary poisoning on non target species such as small carnivores, which are key species in ecosystems notably as regulators of small mammal populations (Hanski *et al.,* 2001; Dupuy *et al.,* 2009).

Some small carnivores have been observed within oil palm plantations (Scott *et al.,* 2004; Maddox *et al.,* 2007), but very few is known on how suitable this habitat is for these species, and about the prey-predator relationship in oil palm landscapes.

The research aims to document the potential of oil palm landscapes for conservation of small carnivores and to investigate the role of small carnivore communities for the regulation of rodent populations in oil palm plantations. Specifically we aim to assess the variations of small carnivore distribution and diet according to landscape and practices, and complementarities with barn owl predation.

Rodent dissection.

Collecting scats along pedestrian transect.

Trapping.

How?

Investigating the diversity and the spatial distribution of small carnivores, using scat collection and night spot-sight counts; interview of local people, camera-trapping, and possibly track stations and hair snares, will also be used to confirm presence of species;

Assessing the dietary variations and overlap of the predator community (barn owl, carnivore) from faeces and pellet content analysis;

Assessing prey relative abundance in contrasted situations (e.g. low versus high density of predators, close versus far from forest patch, etc.) by standard trapping.

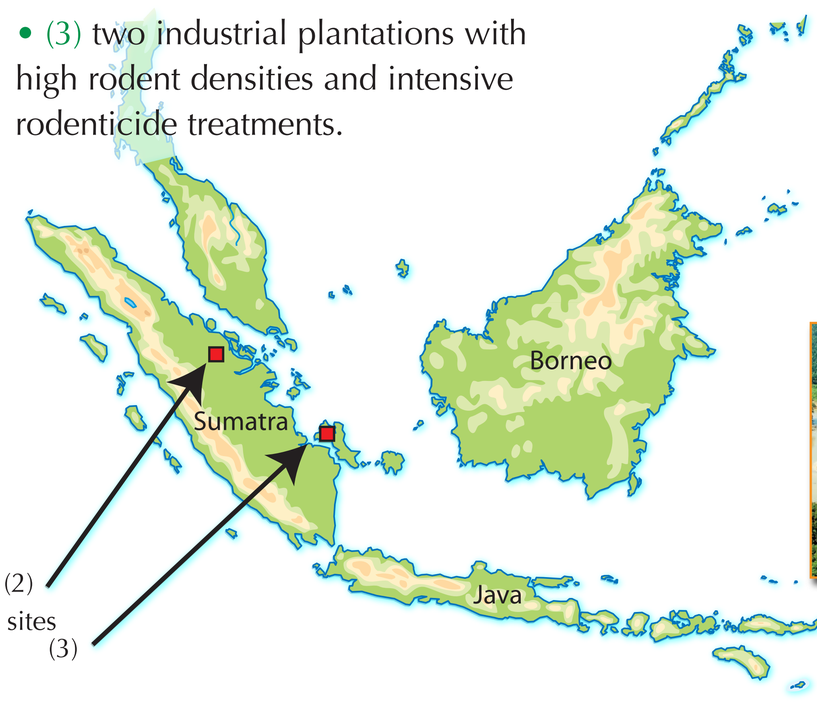
Methodology

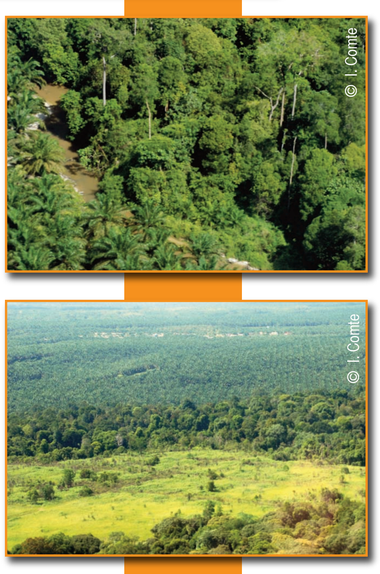
Where?

Four sites have been selected in Sumatra and Bangka, representing three contrasted situations:

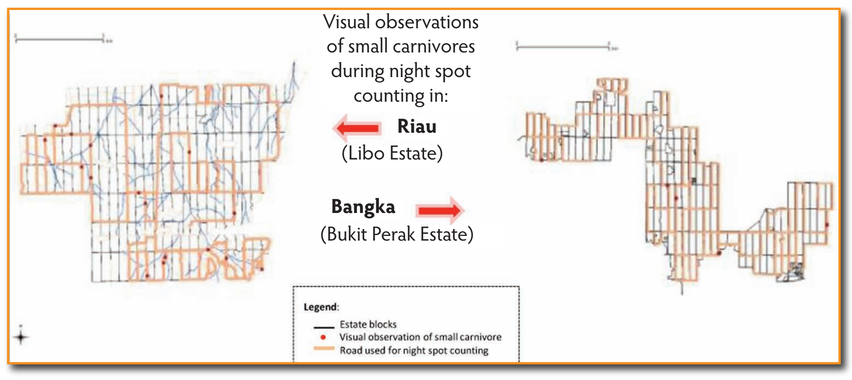
- (1) an industrial plantation in a homogeneous landscape of oil palm;
- (2) an industrial plantation in a mixed landscape (riparian forest, forest patches, savanna, small holders and industrial plantations);
- (3) two industrial plantations with high rodent densities and intensive rodenticide treatments.

Sites (1) & (2) have not been treated using rodenticide since more than 10 years.





Preliminary results on small carnivore abundance and distribution



So far, surveys have revealed:

- in Riau, larger density of small carnivores in mixed oil palm landscape compared to homogenous oil palm landscape;
- lower density of small carnivores in Bangka island, on plantations with higher rodent densities and intensive rodenticide treatments.
- Suitability of oil palm landscape for the leopard cat (relative high density in the homogeneous landscape in Riau) seems to be confirmed.

Ongoing and coming...

- Seasonal and inter-annual replicates on transects
- Camera trapping
- Dietary analyses
- Comparisons between the age structure of rat populations in the Barn Owl diet and in the field
- (Geo)statistical analysis of scat and animal distributions; within and between sites comparisons

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