

## Small Carnivores Contribute to Rat Control in Oil Palm Plantations

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### ABSTRACT

Rapid expansion of oil palm cultivation in Southeast Asia raises concerns about biodiversity conservation. Moreover, rats are invasive pests in oil palm plantations, often causing substantial damages. In Indonesia, rat control is generally based on field treatment using anticoagulant rodenticides and/or on reinforcement of predation by barn owls (*Tytoalba*), by providing nest boxes within the plantation. Rodenticide use is costly for the producer and can indirectly poison non-target species such as rat predators. Thus, biological control of rat pests should be promoted, both from conservation and production points of view. Within the assemblage of rat predators, small carnivores may contribute to rat population regulation. However the persistence of small carnivores within oil palm plantations, their habitat use, their diet and their contribution to rat control have been poorly investigated.

We conducted a 3-year comparative study (2010-2012) in well-established oil palm plantations in Riau and Bangka provinces, in Indonesia: in both areas barn owl populations are successfully reinforced, but in Riau rat populations have been maintained at an acceptable level without the use of rodenticide for more than 10 years, whereas in Bangka intensive rodenticide applications did not prevent high levels of rat damages.

We compared those two contrasted systems in term of predator communities (barn owls and small carnivores) abundance and/or diet. In the poster, we will only present results related to small carnivores. Using a kilometric abundance index yielded from spotlight and faeces counts, we found that small carnivores were much more abundant in Riau plantations than in Bangka, and that the leopard cat (*Prionailurus bengalensis*) was the dominant species in Riau and absent from Bangka. Other species were found in our study sites, i.e. the common palm civet (*Paradoxurus hermaphroditus*), the Malay civet (*Viverra zibetha*) and the small-toothed palm civet (*Artogalidia trivirgata*), but, from literature review, only the leopard cat is known to feed mainly on rats when available. We investigated the diet at community level and we did not detect no significant differences in frequency of occurrence (FO) or volume of small mammal's food items in the faeces of small carnivores between Bangka and Riau; however, we found that the importance of vegetal food items in the diet of small carnivores was greater ( $p=0.035$ ) in Bangka (FO=51.1%) than in Riau, (FO=30.9%), thereby reflecting differences in predator community composition between both areas. Our results on small carnivore community composition, abundance and diet suggest that rat prey intake from this predator community would be less in Bangka plantations than in Riau.

Prey-predators relationship in agricultural landscape is a complex issue. It is a challenge to determine if predation by a peculiar population or community, such as small carnivores, may be contingent to a low level of prey, or may be a necessary factor to limit prey population. Broadly, our results suggest that barn owls cannot regulate rat population on their own, and that small carnivores probably play an important role, in the framework of a multi-factor hypothesis. Therefore, in a view to improve rat control, the producer should adapt agricultural practices and favor appropriate land-use in order to enhance small carnivores (notably leopard cats) within oil palm plantations. But many questions remain before to be able to give precise recommendations on this issue (Does

rodenticide have the opposite effect to the one intended? How much does the leopard cat rely on forest habitat for survival in oil palm landscape? What would be the negative effects of leopard cat introduction on Bangka Island?. For more information on the land-use and habitat preference issue, another poster will investigate spatial distribution of small carnivores within oil palm plantations.