

## **Responses of tropical fruit bats to monoculture and polyculture farming in oil palm smallholdings**

### **ABSTRACT**

The oil palm industry is one of the main economic drivers in Southeast Asia. The industry has caused tropical deforestation on a massive scale in producing countries, and this forest conversion to oil palm agriculture has decimated the habitat of numerous native species. Monoculture and polyculture practices are two distinctive oil palm production systems. We hypothesize that polyculture farming hosts a greater diversity of species than monoculture farming. Habitat complexity in smallholdings is influenced by multiple farming practices (i.e. polyculture and monoculture). However, little is known about the effects of such farming practices in smallholdings on mammalian biodiversity, and particularly frugivorous bats. Our study aimed to find the best farming practice to reconcile oil palm production with biodiversity conservation. Mist-nets were used to trap frugivorous bats at 120 smallholdings in Peninsular Malaysia. We compared species richness and the abundance of frugivorous bats between monoculture and poly-culture smallholdings. We investigated their relationships with vegetation structure characteristics. Our results revealed that species richness and abundance of frugivorous bats were significantly greater in polyculture smallholdings than monoculture smallholdings. We also found that 28.21% of the variation in species richness was explained by in situ habitat characteristics, including the number of dead standing oil palms and immature oil palms, non-grass cover, height of non-grass cover, and farming practices. Their in situ habitat quality was closely associated with oil palm farming management. Commercial growers should implement polyculture rather than monoculture farming because polyculture farming has positive effects on the abundance and species richness of bats in oil palm production landscapes.

**Keyword:** Agriculture; Frugivorous bats; Biodiversity; Conservation; Oil palm; Smallholdings