Effects of monoculture and polyculture farming in oil palm smallholdings on terrestrial arthropod diversity

ABSTRACT

Oil palm agriculture has become one of the economic mainstays for biodiversity-rich countries in the tropics. The conversion of native forests to oil palm monoculture plantation has caused unprecedented biodiversity loss in Southeast Asia. Little is known about the effects of oil palm polyculture farming on arthropod diversity. In this study, arthropods were sampled using pitfall traps at 120 sites in Peninsular Malaysia. We examined how arthropod biodiversity responded to different oil palm farming practices and local-scale vegetation structure characteristics. We found that the number of arthropod orders was significantly greater in polyculture than monoculture smallholdings. However, we did not detect a significant difference in arthropod order composition nor abundance between monoculture and polyculture practices. In situ habitat characteristics explained 16% of the variation in arthropod order richness, with key predictor variables including farming practice, height of oil palm stands, and number of immature palm. The findings of this study suggest that polyculture farming together with management for in situ habitat complexity may be a useful strategy in supporting biodiversity within in oil palm plantations.

Keyword: Arthropods; Diversity; Habitat characteristics; Farming practice; Oil palm smallholdings