

IMPACT OF LOCAL AND LANDSCAPE FACTORS ON DIVERSITY AND FUNCTION OF SPIDERS IN TROPICAL FORESTS OF THAILAND

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INTRODUCTION

The dramatic decline in tropical forests is one of the most serious environmental problems in recent history (Lamb 2014, Rosa et al. 2016). Most of the tropical forests of Southeast Asia are under the pressure of deforestation and land-use change (Asner et al., 2009; Vityakon et al., 2004). It leads to the loss of functionally important organisms and alters the local food-webs (Barnes et al., 2014; Derhé et al., 2016; Potapov et al., 2019). The decline in spider diversity affects the ecosystem processes such as decomposition and primary production (Lawrence and Wise, 2000; Nyffeler and Birkhofer, 2017; Michalko et al., 2019). Spiders are influenced not only by local factors (habitat structure) but also by landscape factors (landscape structure) (Horváth et al., 2019). Nevertheless, it is still largely understudied how the local and landscape factors affect the diversity and functions of spiders in tropical forests.

METHODS

We studied predator-prey interactions along the agricultural intensification gradient in dry dipterocarp forests of Thailand. In the next experiment, we sampled spiders to reveal the impact of reforestation by native (*Shorea* spp., *Hopea* spp.) and non-native (*Eucalyptus* spp., *Acacia* spp.) tree species on spider diversity in Northeast Thailand (Sakaerat Silvicultural Research Station). Furthermore, we analysed how the reforestation type (*Eucalyptus*, secondary succession) affects the presence of trophic cascades in comparison to natural control represented by dry evergreen forest. The trophic cascade was represented by the effect of invertebrate predators on the decomposition rate.

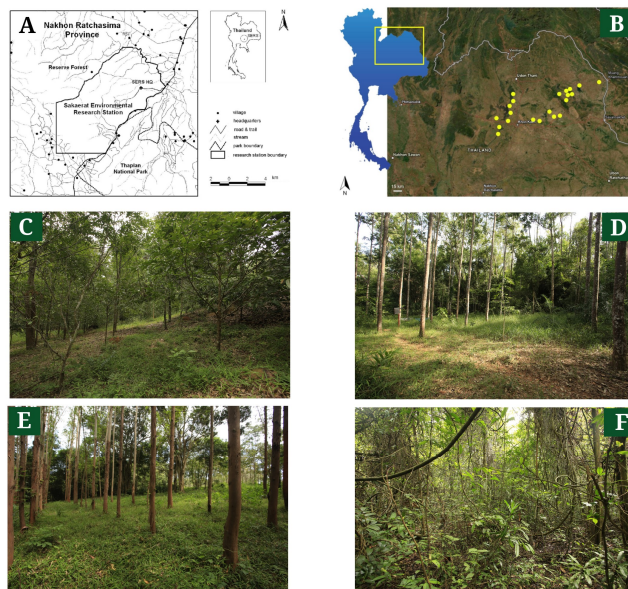


Fig. 1: (A) Location of the Sakaerat Environmental Research Station (Trisurat 2010), (B) Study sites of dipterocarp forests, (C) *Hopea* sp., (D) *Shorea* sp., (E) *Eucalyptus* sp.

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RESULTS

The vegetation structure did not influence the food-webs, however, the food-webs were affected by the land use. The evenness of captured prey was affected by the proportion of agroecosystems. It showed a hump-shaped relationship, thus indicating weak to moderate landscape diversification could support ecosystem functioning in dry dipterocarp forests. The web type influenced the prey composition and the total number of captured prey was affected by the total prey availability. We revealed that the land-use change from forests to agricultural landscapes is a significant threat to the functioning of the dry dipterocarp forests.

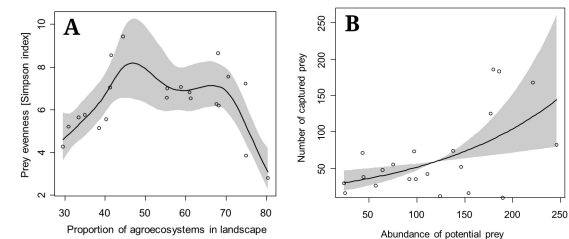


Fig. 2: (A) The effect of proportion of agroecosystems in landscape on prey evenness, (B) The effect of total prey availability on number of captured prey

In our preliminary results, we revealed that predator exclusion increased the decomposition rate in secondary forests. Our preliminary data suggest that spiders may be responsible for the shift in the decomposition rate in the secondary forests as they were the dominant predator group. Therefore, they are an essential part of the proper functioning forest ecosystem of Thailand.

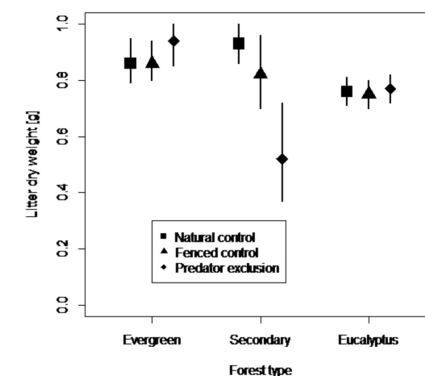


Fig. 3: The effect of invertebrate predator exclusion on the decomposition rate

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