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Effects of termite activities on coarse woody debris decomposition in an intact lowland mixed dipterocarp forest of Brunei Darussalam

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Tropical forests have been considered important ecosystems in terms of carbon cycle and climate change, because they sequester carbon more than any other terrestrial ecosystems. In addition, coarse woody debris is one of the main carbon storages, accounting for $10 - 40\%$ of the tropical forest carbon. Carbon in coarse woody debris is released by various activities of organisms, and particularly termite's feeding activities are known to be main process in tropical forests. Therefore, investigating the effects of termite activities on coarse woody debris decomposition is important to understanding carbon cycles of tropical forests. This study was conducted in an intact lowland mixed dipterocarp forest (MDF) of Brunei Darussalam, and three main MDF tree species (Dillenia beccariana, Macaranga bancana, and Elateriospermum tapos) were selected. Coarse woody debris samples of both 10 cm diameter and length were prepared, and half of samples were covered twice with nylon net (mesh size 1.5 mm $\times$ 1.5 mm) to prevent termite's approach. Three 2 m $\times$ 11 m permanent plots were installed in January, 2015 and eighteen samples per plot (3 species $\times$ 2 treatments $\times$ 3 repetitions) were placed at the soil surface. Weights of each sample were recorded at initial time, and weighed again in August, 2015. On average, uncovered and covered samples lost 18.9 % and 3.3 % of their initial weights, respectively. Weight loss percentage was highest in uncovered samples of M. bancana (23.9 %), and lowest in covered samples of E. tapos (7.8 %). Two-way ANOVA showed that tree species and termite exclusion treatment had statistically significant effects on coarse woody debris decomposition (P = 0.0001). The effect of species and termite exclusion treatment interaction was also statistically significant (P = 0.0001). The result reveals that termite activities promote the coarse woody debris decomposition and they influence differently along the wood species. However, many samples of D. beccariana increased in weight, and it might result from invasion of epiphyte plants and changes in water contents.