The combined impacts of experimental defaunation and logging on seedling traits and diversity

ABSTRACT

Animals can have both positive (e.g. via seed dispersal) and negative (e.g. via herbivory) impacts on plants. The net effects of these interactions remain difficult to predict and may be affected by overhunting and habitat disturbance, two widespread threats to tropical forests. Recent studies have documented their separate effects on plant recruitment but our understanding of how defaunation and logging interact to influence tropical tree communities is limited. From 2013 to 2016, we followed the fate of marked tree seedlings (n ¼ 1489) from 81 genera in and outside experimental plots. Our plots differentially excluded small, medium and large-bodied mammal herbivores in logged and unlogged forest in Malaysian Borneo. We assessed the effects of experimental defaunation and logging on taxonomic diversity and plant trait (wood density, specific leaf area, fruit size) composition of seedling communities. Although seedling mortality was highest in the presence of all mammal herbivores (44%), defaunation alone did not alter taxonomic diversity nor plant trait composition. However, herbivores (across all body sizes) significantly reduced mean fruit size across the seedling community over time (95% confidence interval (CI): 20.09 to 20.01), particularly in logged forest (95% CI: 20.12 to 20.003). Our findings suggest that impacts of mammal herbivores on plant communities may be greater in forests with a history of disturbance and could subsequently affect plant functional traits and ecological processes associated with forest regeneration.