

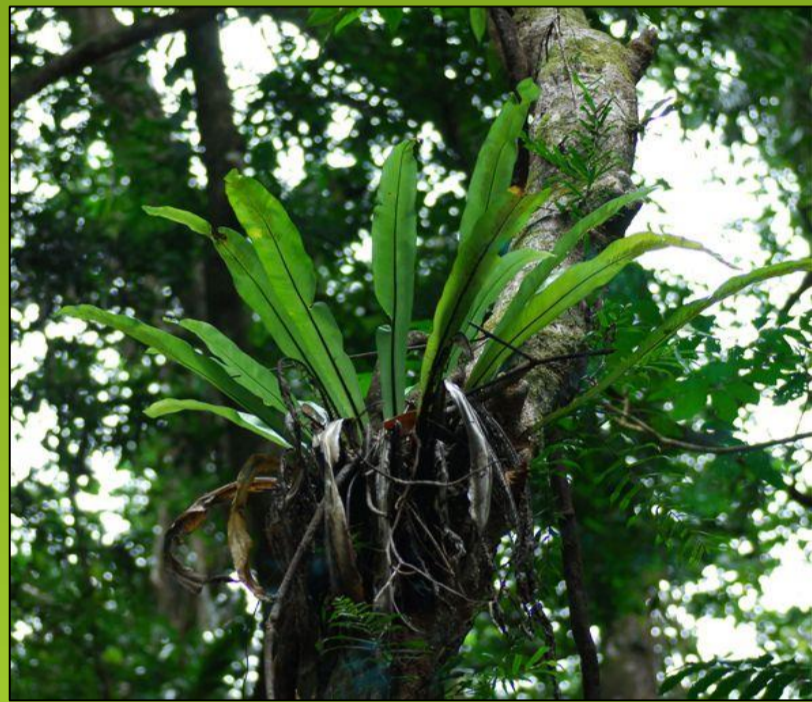
Clinging on: the effects of logging on epiphyte abundance



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Introduction

Epiphytes make up a large proportion of the biodiversity observed in rainforests, representing 25% of all vascular plants¹. They also provide habitats for many species, specially amphibians which are an already globally threatened species. Epiphytes accumulate large amounts of falling detritus, supporting the forest recycling system². With Borneo experiencing rapid economic growth, the countries forest have become a primary source of tropical hardwood^{3,4}. Logging therefore represents a real threat to the biodiversity of the region. Here we are looking in the effects of logging on the abundance and richness of epiphytes at Gudan Bondang in Central Kalimantan, Borneo and the wider implications this could have.



Methods

- Study sites in both primary and secondary (old growth) logged forest.
- 2 transects were conducted at each site. 10 points were positioned along each transect, with 8 trees being surveyed per point.
- Transects were randomly conducted by pacing 20m, then walking 10m off the path, before surveying the 8 nearest trees with a circumference larger than 20cm.
- Circumference, height, epiphyte abundance and richness were recorded for each tree, as well as the GPS location and the elevation.
- Height was estimated and split into 3 categories: Small <15m, Medium 16m-30m and Tall >30m.

Results

- **Epiphyte abundance increased with tree height** in both primary and secondary rainforests, as seen in figure 1 ($KWx^2=35.08$, $df=2$, $p=0.001$), with a higher abundance in primary forest ($W=282.5$, $p<0.05$).
- **Medium sized trees showed the highest amount epiphyte richness**, shown in figure 2 ($KWx^2=37.34$, $df=2$, $p<0.001$). Epiphyte richness was not significantly different between forests ($W=247.5$, $p=0.1997$).
- **Tree richness was significantly higher in primary rainforest** compared to logged secondary forest ($W=316$, $p<0.001$)
- **Elevation had no significant effect** on the abundance and richness of epiphytes in both primary and secondary rainforest ($KWx^2=40.95$, $df=34$, $p=0.1917$) ($KWx^2=38$, $df=34$, $p=0.259$).

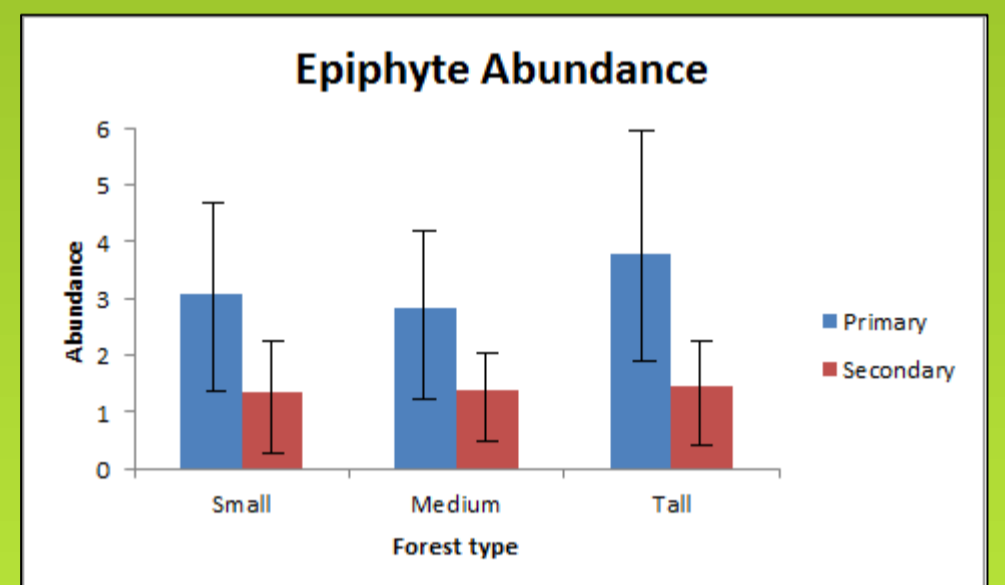


Figure 1: Mean epiphyte abundance in relation to tree height.

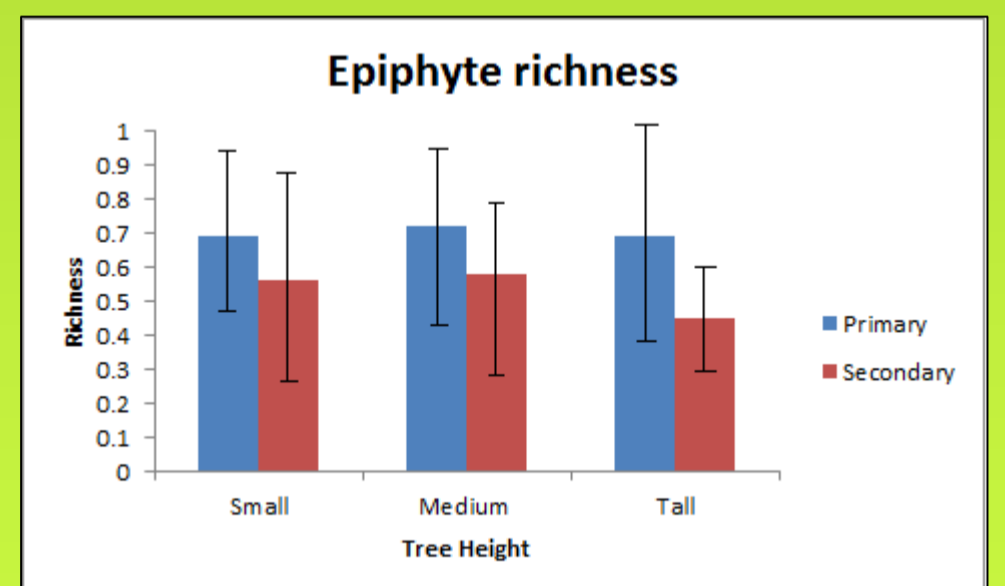
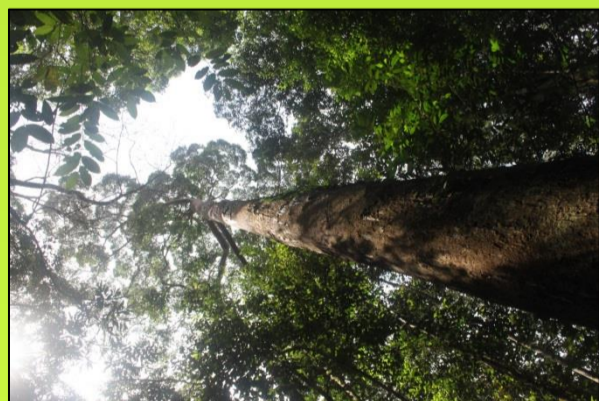
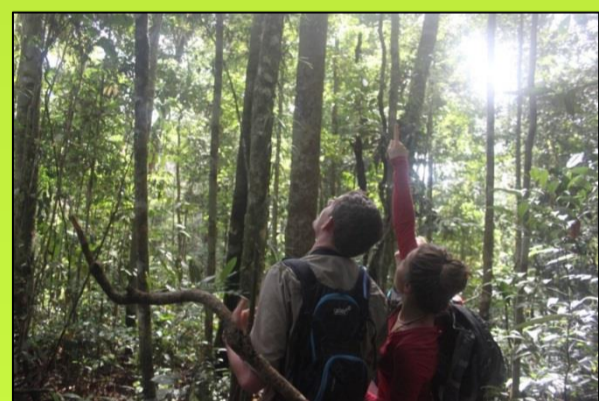


Figure 2: Mean epiphyte richness in relation to tree height.



Discussion

- It is thought that taller trees are of an **older age and wider circumference, giving epiphytes more time and surface area to establish on**. This put epiphytes in particular danger, as taller trees are typically selected for logging^{3,4}.
- Epiphyte abundance was significantly higher in primary rainforest, suggesting that **logging has the potential to reduce the suitability of the habitat for epiphyte growth**. However this result may also be explained by the higher tree richness in primary forest, which provides a wider variety an number of trees for initial epiphyte growth to occur on.
- Epiphyte richness was not significantly different between the two forest types. Possibly due to the small sample area and sample size.
- Our results show that **logging does have an impact on the abundance and richness of epiphytes**. Epiphytes are of great importance, providing micro-ecosystems for many specialised species⁵ and provide a vital ecosystem service in nutrient recycling. These impacts could affect the health and functionality of tropical forests and cause the **extinction of many species**.
- **Further research, on a larger scale** could help to identify more specific impacts of logging on epiphytes. This data can in turn be used to produce better information on managing logging sites and how to better manage the conservation of forests worldwide.

References

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