B01 - Structure, stability and functioning of macro-invertebrate communities in rainforest transformation systems in Sumatra (Indonesia)

Consequences of Tropical Land Use for Multitrophic Biodiversity & Ecosystem Functioning


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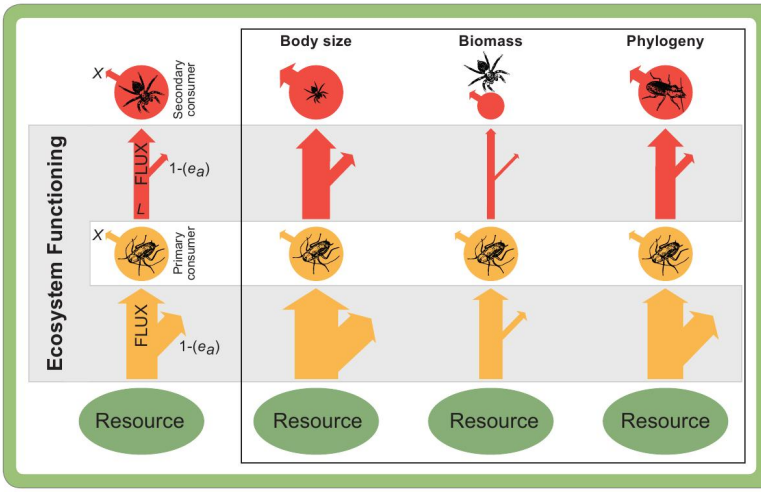
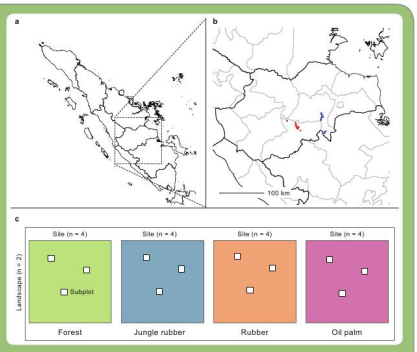


Energy flux as a measure of multitrophic ecosystem functioning

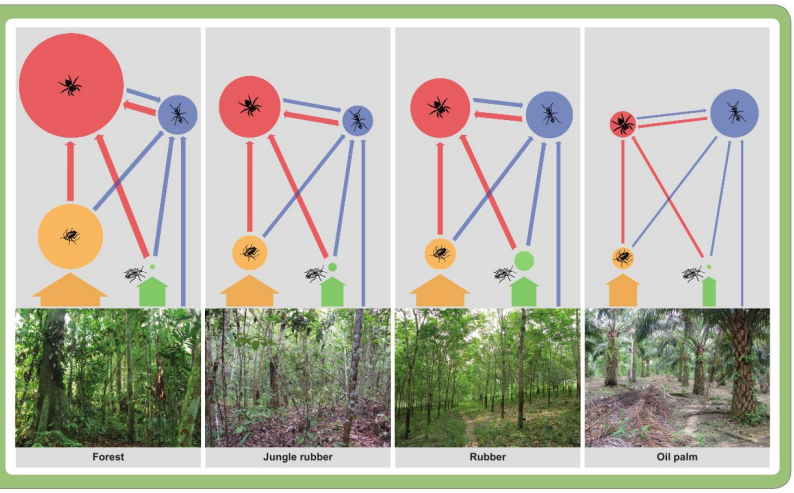
$$F = \frac{1}{e_a} \cdot (X + L)$$

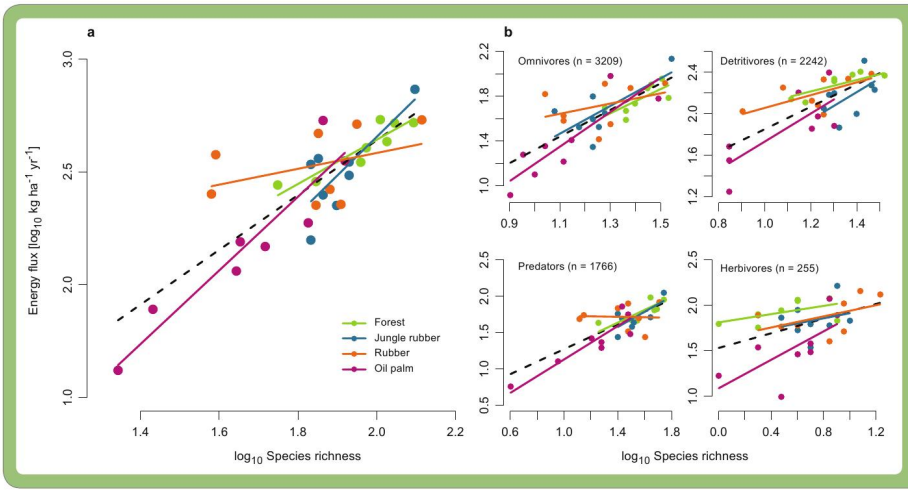


- Litter invertebrates were sampled across varying land-use systems in Sumatra, Indonesia.
- We measured species richness, density, biomass, body size, and metabolic rates for 7472 animals.

Results

- Land-use intensity reduces: species richness, density, biomass and community metabolism.
- Decrease in predator and detritivore biomass **but** increase in omnivore biomass.
- Decrease in whole-community energy flux **but** altered disproportionately to biomasses.
- Our energy flux calculation comprehensively quantifies multitrophic ecosystem functioning.





- Our method allows exploration of biodiversity-ecosystem functioning relationships across trophic levels.
- Energy flux decline with species loss is proportionately strongest in oil palm.

Conclusions

- Ground breaking approach to quantifying multitrophic ecosystem functioning.
- Oil-palm agriculture severely threatens whole-ecosystem processes.

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