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EDGE EFFECTS ON THE NECROMASS AND HETEROTROPHIC RESPIRATION STOCKS IN SEASONALLY DRY BRAZILIAN ATLANTIC FOREST FRAGMENTS

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Tropical forests act as carbon sinks, removing CO_2 from the atmosphere and keeping the carbon stored in biomass. This carbon is slowly release to the atmosphere by the process of decomposition of dead organic matter. The plant necromass is an important part of this cycle and its stocks can be altered by human impacts on the tropical forests. The aim of this study was to quantify the stocks of fine and coarse necromass, and estimate its heterotrophic respiration rates comparing the edge and the interior of five fragments of different sizes of lowland Seasonal Dry Atlantic forest in Rio de Janeiro State, Brazil.

We tested the hypothesis that the necromass stock is higher and the heterotrophic respiration is lower in the edge than in the interior of the fragments. Five forest fragments of different sizes were selected, one biggest and more preserved fragment of 1200ha; and four neighbours' smaller fragments of 13ha, 35ha, 49ha, 55ha. Sampling was carried out during the rainy season (October 2012 to March 2013), in two transects at the edge and two at the interior in each fragment. The coarse necromass was sampled by the LIS (Line Intersect Sample) method and the fine necromass by 50 x 50cm quadrats. The heterotrophic respiration was measured using a portable closed-chamber infrared CO_2 gas analyzer system.

There was no difference on the stocks of coarse and fine necromass between the edge and interior of the fragments. The largest fragment had the lowest stock of fine necromass, while one of the smallest fragments showed the highest stock of coarse necromass. The necromass respiration was positively related with its moisture, and differed significantly between the areas of edge and interior, being higher in the interior. The values of fine and coarse necromass stocks are within the range for the Atlantic Forests. The necromass moisture was the factor that best explained the variations in the rate of heterotrophic respiration. Therefore, the edge effect changed the functioning of the studied seasonal dry forest in relation to the CO_2 release, diminishing the heterotrophic respiration of the necromass.

BEHAVIOURAL ADAPTATIONS OF AN ENDANGERED UNGULATE IN RESPONSE TO TROPICAL FOREST DEGRADATION IN SABAH (MALAYSIA, BORNEO)

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Timber harvesting in Sabah (Malaysia, Borneo) has caused severe degradation of forests, reducing leaf cover which essentially reflects heat and governs ambient temperatures, and leaving behind extensive networks of logging roads that facilitate encroachment. The rare Bornean banteng, which occupies the forests of Sabah, must endure repetitive habitat disturbance and survive in forest with a drastically altered vegetation structure. To understand the impacts of logging and the expression of thermal stress, non-invasive camera traps and non-parametric bootstrapping were used to investigate banteng behavior, habitat use and ambient temperature in three degraded forests with varying regeneration ages.

Forest with the shortest regeneration time (6 years) had the highest temperatures in open areas. In forest with 17 years of regeneration the temperature peak was 3.5°C lower. Banteng responded negatively to temperature in these forests, limiting energy-demanding activities in exposed areas during hot hours but foraging extensively along abandoned logging roads where hunters frequented. In the most regenerated forest (23 years), banteng did not respond negatively to temperature, and they were active throughout the day switching from exposed areas to dense canopy when temperatures peaked.

Thermal stress is highest in forest that is most degraded, and banteng mitigate this by adapting behaviours, energy allocation and use of the forest. They benefited by exploiting degraded grassy areas but increased foraging in these areas increased their vulnerability to hunters. Ambient temperature is not a measure of sustainable forest management however logging negatively alters the climate for many years, which in-turn negatively affects large mammals.