

Comparative Assessment of Carbon Dioxide (CO₂) Absorption in Selected Seedlings At Tekam Forest Reserve Pahang

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Background: Increased emission of carbon dioxide (CO₂) in the atmosphere by man has been a major contributor to climate change on the earth and this has necessitated the need to take natural measures to reduce the concentration of CO₂ in the atmosphere. One of the known characteristics of the tropical forests particularly in Malaysia is its capacity to absorb and store CO₂ making the dipterocarp trees one of the largest contributors in carbon sequestration. Nevertheless, the majority of the research is done on mature trees, where the role of seedlings in initial carbon sequestration is ignored. This study examines the CO₂ sequestration ability of sample dipterocarp and non-dipterocarp seedlings with the Free Air CO₂ Enrichment (FACE) facility operating in Tekam Forest Reserve, Pahang.

Methods: The samples used in this research study were the selected seedlings of dipterocarp (*Richetia multiflora*) and non-dipterocarp (*Knema scortechinii*) species that were put in acrylic boxes to be observed in control. All boxes were provided with CLTM sensors to measure carbon dioxide (CO₂), light, temperature and humidity at 24-hour time intervals. The experiment was done on three consecutive days at the FACE (Free Air CO₂ Enrichment) and control plots in Tekam Forest Reserve, Pahang. Each group had 12 seedlings that were tested under elevated and ambient CO₂ conditions each. The change in CO₂ uptake was measured by difference in initial and final readings. Comparison of species performance and environmental correlations were done using statistical analyses.

Results: This study demonstrates that the dipterocarp and non-dipterocarp seedlings had the capacity to absorb CO₂ though there were distinct changes observed between the two experiments, (FACE and control). *Richetia multiflora* (dipterocarp) exhibited more stable CO₂ absorption during the day, whereas *Knema scortechinii* (non-dipterocarp) exhibited a greater peaks absorption but was less consistent. Both species had better uptake under elevated CO₂ than under ambient conditions. Light intensity was found to positively correlate with CO₂ absorption, but the temperature and humidity had weak effects. Even though the two species responded positively to high CO₂ concentration, dipterocarp seedlings were able to sustain their performance as time elapsed, therefore portraying greater capacity to sequester carbon in the long run.

Conclusion: Seedlings of dipterocarp and non-dipterocarp species can absorb CO₂, however, in more stable conditions, dipterocarp species demonstrated somewhat higher uptake at high conditions. The application of the FACE system managed to simulate future atmospheric situations and demonstrated the potential of some indigenous species, like *Richetia multiflora*, in long-term carbon sequestering. The findings imply that future reforestation and climate change mitigation efforts can be carried out with the assistance of well-performing seedlings.

Keywords: Carbon Dioxide Absorption, *Richetia multiflora*, *Knema scortechinii*

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