

Make Way for Duckweed: Observing the Growth Rates of Lemna and Its Effect on Atmospheric Carbon Dioxide Concentrations in a Simulated Carbon Sink

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With the increasing prospect of large-scale climate change due to anthropogenic carbon dioxide (CO₂) emissions, propositions for controlling effects remain focused in reducing emissions as opposed to directly combatting them. Paleontological evidence suggests massive CO₂ sequestration in the early Cenozoic by way of the floating fern *Azolla*; this experiment revolves around testing the capacity of a hardy analogue, duckweed (*Lemna* sp.), as a candidate for reducing atmospheric CO₂ concentrations on a large scale. Three replicate trials were conducted to measure CO₂ levels and duckweed growth with dry ice added as CO₂. Trials were comprised of three groups – C (increased CO₂), DC (100 g *Lemna*, no CO₂), and DE (100g *Lemna*, elevated CO₂). Hypotheses included: 1) Presence of *Lemna* in high-CO₂ environments would lead to prominent rates of localized atmospheric CO₂ depletion. 2) *Lemna* populations exposed to higher CO₂ levels would experience greater overall growth. CO₂ readings were taken every four hours during a 48 hour trial period, while a single duckweed measurement was taken following all three trials' completion. Data analysis has indicated that although *Lemna* populations exhibited no determinable growth differences between different CO₂ concentrations, a statistically significant decrease of approx. 30.30% in CO₂ levels in the DC and DE groups compared to the control groups was observed. Extrapolated into a larger scale, this indicates removal rates of up to 698.2 kg per day by an acre of duckweed, making it conclusive that *Lemna* is capable of rapidly reducing elevated CO₂ levels in a simulated carbon sink.

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