

CO2 Fertilization May Fail in the Amazon

A new experiment tests whether trees store more carbon — or leak it back.

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620 p.p.m.

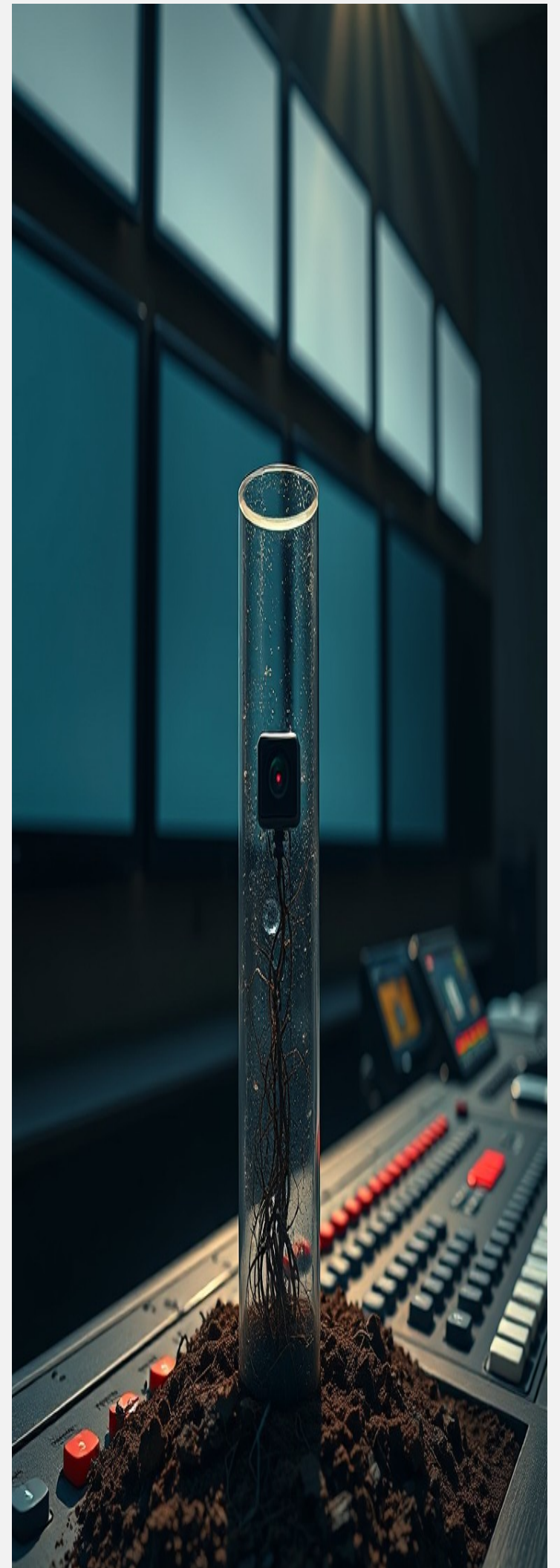
Target CO2 Level

The AmazonFACE experiment will simulate future atmospheric conditions.

The experiment will test whether increased photosynthesis leads to long-term carbon storage in Amazonian trees, or whether carbon is instead lost through soil or other pathways.

Source: Nature · Published October 10, 2026

https://www.nature.com/immersive/d41586-026-02909-3/index.html?error=cookies_not_supported&code=66565cfa-1627-45ae-95c7-f335f7640657



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Carbon Storage Is Not Guaranteed

The AmazonFACE experiment challenges the assumption that higher CO₂ automatically means greater carbon sequestration. Even if photosynthesis increases, the forest may not retain carbon if soil nutrient limitations — like low phosphorus — prevent trees from converting CO₂ into long-lived biomass. This reveals a critical gap in climate models: biological constraints can override atmospheric fertilization effects.



02

AI Models Must Account for Hidden Feedbacks

Climate simulations often treat forests as passive carbon sinks, but AmazonFACE suggests they may behave as dynamic systems with nonlinear responses. If AI-driven climate models fail to incorporate soil biogeochemistry or root-level dynamics, they risk overestimating carbon sequestration. This demands that AI safety frameworks in environmental science include rigorous validation against real-world experimental data — not just theoretical projections.

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