The Important Discovery of a Greenhouse Gas "Bio-Catcher": Carbon Fixation in Trentepohlia

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Blood red boulders are scattered across a large area above the creek in Hailuogou, Gongga Mountain, Sichuan, the red matter attached to the stones is a species of Trentepohlia, a type of subaerial filamentous green chlorophyte algae which can be used as a greenhouse gas “bio-catcher” in the future. In order to test the anti-stress ability and carbon fixing ability of Trentepohlia, chlorophyll fluorescence analysis and far-infrared gas analysis were used and I found that the algae’s maximum photochemical productivity reached 0.67 ±0.015, and displayed no significant variation across a range of radiation intensities from 0 to 400 μW cm-2; it also possesses strong tolerance for UV radiation. At 10° C, with a light intensity of 45 μmol m-2 s-1, its carbon fixation capacity is 351.57 μmol CO2 mg-1 Chl a h-1—2.6 times that of Nostoc, and 1.4 times that of Chlorella under similar conditions, reflecting the algae’s relatively strong capacity for fixing carbon dioxide. The algae’s light compensation point of photosynthesis is 28 μmol m-2 s-1, and its light saturation point is 565 μmol m-2 s-1, light of intensity over 800 μmol m-2 s-1 triggers a sharp decline in carbon fixation, that means the cells have a light protection mechanism; Calculations using the data from testing reveal that the Trentepohlia algae in Hailuogou sequester approximately 10 tons of CO2 a year.

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