

Abstract Submitted
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Plasticity of metabolic networks and the evolution of C4 photosynthesis ELI BOGART, CHRIS MYERS, Cornell University — Over 50 groups of plants have independently developed a common mechanism (C4 photosynthesis) for increasing the efficiency of photosynthetic carbon dioxide assimilation. Understanding the high degree of evolvability of the C4 system could offer useful guidance for attempts to introduce it artificially to other plants. Previously, the nonlinear relationship between carbon dioxide levels and rates of carbon assimilation and photorespiration has prevented the application of genome-scale metabolic models to the problem of the evolution of the pathway. We apply a nonlinear optimization method to find feasible flux distributions in a plant metabolic model, allowing us to explore the plasticity of the metabolic network and characterize the fitness landscape of the transition from C3 to C4 photosynthesis.

Eli Bogart
Cornell University

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