

ENVIRONMENTAL STRESS AND EVOLUTION OF THE VOLVOCACEAE. D. R. Davison¹ and R. E. Michod¹ ¹Department of Ecology and Evolutionary Biology, University of Arizona, Tucson, Arizona, 85710

Environmental stressors can affect patterns of speciation and phenotypic evolution. However, the relationship between the environmental stressors present during the radiation of a clade and the phenotypic traits possessed by that clade is understudied and poorly understood. The Volvocaceae (Volvocine green algae) can be used to investigate the ways in which environmental stressors that coincided with speciation relate to present-day phenotypes. This clade radiated between 200 and 250 MYA, during a time of widespread environmental fluctuations that included changes in the carbon-nitrogen cycle and the redox environment. Volvocine algae demonstrate a high degree of phenotypic sensitivity to an array of environmental stressors, most notably nitrogen deprivation and changes to redox chemistry, with some species switching from asexual to sexual reproduction in response to stress while others transition from a multicellular state to being single celled. We subjected fifteen Volvocine algae strains to nitrogen deprivation and heat shock to determine the distribution of sensitivity to environmental stressors across the phylogeny. We then explore the connections between the paleoenvironment and modern-day stress responsivity.