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Behavioral Response of Zooplankton to Environmental Cues Associated with Structure in the Ocean D.R. WEBSTER, C.B. WOODSON, M.J. WEISSBURG, J. YEN, Georgia Tech — Recent observations of zooplankton aggregations in the ocean raise questions about the importance of copepod behavioral responses to layers of velocity gradient, density gradient, and dissolved chemicals and the influence of environmental structure in predator-prey dynamics. The current study uses controlled laboratory experiments to examine the response of several species of copepods to these layers and to identify and define the physical and chemical cues that these organisms exploit to improve foraging efficiency. Copepod response to horizontal layers of strain rate, density jump, and phytoplankton chemical exudates are observed in a laminar plane jet in order to isolate specific cues and combinations of cues. Particle image velocimetry (PIV) and laser induced fluorescence (LIF) quantify the environmental cues, and video-based observation quantifies path kinematics and swimming behavior. Behaviors elicited by the velocity gradient and chemical exudate layers include increased swimming speed and turn frequency consistent with excited area-restricted search behavior, which leads to increased proportional residence time in the layers. In contrast, the density gradient layer acts as a barrier to vertical movement and not as a positive cue for area-restricted search behavior.

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