

Abstract Submitted
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Filter feeding mechanics of *Hypophthalmichthys molitrix* regarding porous gill rakers¹ DAVID PALUMBO, KARTIK V. BULUSU, KARLY COHEN, PARTICIA HERNANDEZ, MEGAN C. LEFTWICH, MICHAEL W. PLESNIAK, George Washington University — The silver carp (*Hypophthalmichthys molitrix*) is a filter-feeding fish known to feed upon algal-growth in lakes, rivers, and aquacultures. The filter-feeding process centers on sponge-like membranes located in the carps pharynx supported by fused gill rakers (GRs), which can efficiently strain suspended food particles as small as 4 μ m without clogging. Guided by the anatomy of the silver carp, scanning electron microscope (SEM) images of GRs, and video of the silver carp feeding, we have hypothesized that the filtration mechanism involves a pump-based biological function to capture food particles within the GRs. Dye visualization experiments were performed on a silver carp cadaver head, an excised GR sample, and on a scaled GR in vitro model - the Artificial Gill Raker (AGR). Measurements are performed for the AGR using laser Doppler velocimetry (LDV) and penetration pressure monitoring with a biologically-inspired pumping mechanism. The role of mucus in the retention and capture of food particles has also been explored through rheological measurements, and further experimentation is planned. Our motivation stems from the potential to develop bioinspired industrial-scale filtration technologies ranging from wastewater treatment to filtration in the food industry.

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