



# AQUATIC AND FISHERY SCIENCES

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## UNIVERSITY of WASHINGTON

Dear Chris Martyniuk, Matt Rise, and Muyan Chen,

We are pleased to submit the enclosed manuscript, "Pacific geoduck (*Panopea generosa*) resilience to natural pH variation," for consideration in the special issue of Comparative Biochemistry and Physiology - Part D: Genomics and Proteomics focused on Aquaculture. Pacific geoduck aquaculture is a fast growing industry, with strong overseas demand as a luxury commodity fetching \$150/pound at retail in Asia. Despite the expanding investment in this emerging aquaculture species, very little is known about optimal growing conditions, geoduck physiology, or industry prospects under future ocean conditions.

Using proteomics methods, this is the first study to explore geoduck growth, survival, and physiology under varying environments. We focus on the species' response to low pH, as there is growing evidence that marine calcifiers are maladapted to declining pH due to ocean acidification. This study has three meaningful contributions for geoduck aquaculture: we 1) show that geoduck are resilient to highly variable pH (6.71 to 8.34); 2) suggest that other environmental drivers (temperature, dissolved oxygen variability) may be more influential for geoduck growth, and 3) contribute a comprehensive proteomic resource (8,077 proteins) for future research on the Pacific geoduck. Together these results provide important information on the physiological response of molluscs and inform growers and hatcheries on geoduck performance in various natural settings. Additionally, we confirm that eelgrass beds can effectively and considerably alter local pH in a heterotrophic estuary, and demonstrate a useful experimental design for ocean acidification studies for cultured shellfish.

This manuscript is not under consideration by another journal, nor has it been published, and all authors approve the manuscript and its submission to CBPD. Thank you for your consideration.

Sincerely,  
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