

Project Report

Title: Development of Genomic Markers for Environmental Resilience in Mussels

Reporting Period: March, 2022

(A) Project Summary

Our project seeks to support the sustainable expansion of the shellfish aquaculture industry by investigating the downstream impact of ocean acidification (OA) and ocean warming (OW) on the survival and successful cultivation of marine bivalves. Our research *objective* is to describe the response of commercially relevant species of marine mussels to current and near-future OA and OW, utilizing cutting-edge molecular technologies to identify genetic markers that confer resilience to environmental change. In collaboration with our industry partner, Penn Cove Shellfish LLC, the measure of success for this proposal will be the identification of genetic markers that, when used as selection criteria for mussel broodstock, will produce adults with robust attachment to aquaculture lines under near-future OA and OW. By defining these gene-environment interactions, our results stand to support commercial growers in the development of selective breeding programs to ensure the efficient, sustainable, and profitable production of mussels within the United States.

(B) Summary of Progress and Results

During the March 2022 reporting period, a majority of our effort was allocated to analyzing RNA sequencing data received from the University of Texas at Austin's Genomic Sequencing and Analysis Facility. We received 3'-end TagSeq complementary sequences from the foot and gills of 72 mussels (*Mytilus trossulus*) exposed to different environmental conditions. Reads were trimmed using Cutadapt and subsequently aligned to the *Mytilus edulis* genome using Hisat2. Sequence assembly was performed using StringTie 2, followed by count analysis using DESeq.

(C) Challenges

We have no challenges to report during this period.