

**Update Report**

Period: 2/1/2012 - 1/31/2013

Project: R/LME/N-3 - *Alleviating Regulatory Impediments To Native Shellfish Aquaculture***:: STUDENTS SUPPORTED**

**Chi, Bradley**, bchi@u.washington.edu, University of Washington, SAFS, status:new, *no field of study, no advisor*, degree type:BS, degree date:2012-12-01, degree completed this period:No

Student Project Title:

Effects of photoperiod and mechanical stress on Olympia oyster physiology

Involvement with Sea Grant This Period:

capstone

Post-Graduation Plans:

grad school

**Jackson, Katie**, k.e.jackson.1992@gmail.com, University of Washington, SAFS, status:new, *no field of study, no advisor*, degree type:BS, *no degree date*, degree completed this period:No

Student Project Title:

Genetic sample management and optimizing oyster relaxation

Involvement with Sea Grant This Period:

intern

Post-Graduation Plans: *none*

**Timmins-Schiffman, Emma**, emmats@u.washington.edu, University of Washington, School of Aquatic and Fishery Sciences, status:cont, field of study:Fisheries, advisor:Roberts, degree type:PhD, degree date:2013-12-01, degree completed this period:No

Student Project Title:

Olympia oyster transcriptome characterization and genetic marker development

Involvement with Sea Grant This Period:

graduate student

Post-Graduation Plans:

employment

**:: CONFERENCES / PRESENTATIONS**

*No Conferences / Presentations Reported This Period*

**:: ADDITIONAL METRICS**

P-12 Students Reached:

P-12 Educators Trained:

Participants in Informal Education Programs:

Volunteer Hours:

Acres of coastal habitat protected, enhanced or restored:

Resource Managers who use Ecosystem-Based Approaches to Management:

Annual Clean Marina Program - certifications:

HACCP - Number of people with new certifications:

**:: ECONOMIC IMPACTS***No Economic Impacts Reported This Period***:: SEA GRANT PRODUCTS**

Description	Developed?	Used?	ELWD?	Number of Managers	Names of Managers
Transcriptome and genetic markers for the native Olympia oyster to inform restoration efforts. R/LME/N-3	Yes	No		0	

**:: HAZARD RESILIENCE IN COASTAL COMMUNITIES***No Communities Reported This Period***:: ADDITIONAL MEASURES**

Number of stakeholders modifying practices:

Sustainable Coastal Development  
# of coastal communities:**:: PARTNERS**

Partner Name: NOAA Manchester lab

Partner Name: Puget Sound Restoration Fund

**:: IMPACTS AND ACCOMPLISHMENTS**

Title: Transcriptome characterization of the Olympia oyster

Type: accomplishment

Description:

Sequenced transcriptome of Olympia oyster and identified genetic markers. This will be the foundation for future research efforts.

Recap:

Characterized the Olympia oyster transcriptome.

Comments: *none*Related Partners: *none***:: PUBLICATIONS**

**Title: Transcriptome characterization of the Olympia oyster and pinto abalone**

Type: Internet Resources, Topical Websites Publication Year: 2013

Uploaded File: *none*

URL: <http://dx.doi.org/10.6084/m9.figshare.156431>

**Abstract:**

Open Access data on transcriptome of the Olympia oyster and pinto abalone.

Data S1. *Ostrea lurida* transcriptome. Assembled contigs of *O. lurida* transcriptome sequencing.

Data S2. *Haliotis kamtschatkana* transcriptome. Assembled contigs of *H. kamtschatkana* sequencing.

Data S3. *Ostrea lurida* SPIDs. BLASTx results for *O. lurida* contig search against the UniProtKB/Swiss-Prot database. BLAST e-values and gene descriptions are also given.

Data S4. *Ostrea lurida* GO. Gene Ontology annotations of *O. lurida* contigs. GO annotations are made based on associations with a Swiss-Prot ID.

Data S5. *Haliotis kamtschatkana* SPIDs. BLASTx results for *H. kamtschatkana* contig search against the UniProtKB/Swiss-Prot database. BLAST e-values and gene descriptions are also given.

Data S6. *Haliotis kamtschatkana* GO. Gene Ontology annotations of *H. kamtschatkana* contigs. GO annotations are made based on associations with a Swiss-Prot ID.

Data S7. *Ostrea lurida* bitscores. Bit scores for BLASTn results of *O. lurida* contigs against species-specific databases of other closely related species.

Data S8. *Haliotis kamtschatkana* bitscores. Bit scores for BLASTn results of *H. kamtschatkana* contigs against species-specific databases of other closely related species.

Data S9. *Ostrea lurida* SNPs. SNP information for putative SNPs identified in the *O. lurida* transcriptome. Contig numbers are listed in the leftmost column, followed by SNP location and allele. Annotations of the contigs, as determined through a BLASTx against the UniProtKB/Swiss-Prot database, are given along with the e-value for the BLAST result.

Data S10. *Haliotis kamtschatkana* SNPs. SNP information for putative SNPs identified in the *H. kamtschatkana* transcriptome. Contig numbers are listed in the leftmost column, followed by SNP location and allele. Annotations of the contigs, as determined through a BLASTx against the UniProtKB/Swiss-Prot database, are given along with the e-value for the BLAST result.

**Citation:**

Transcriptome characterization of the Olympia oyster and pinto abalone. Steven Roberts, Emma Timmins-Schiffman. figshare. February 11, 2013.

<http://dx.doi.org/10.6084/m9.figshare.156431>

**Copyright Restrictions + Other Notes:**

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Journal Title: *none*

**Title: Effects of photoperiod and mechanical stress on Olympia oyster physiology**

Type: Workshops, Proceedings, Symposia Including Highlights/Summaries of (please note: document number reflects the year the proceedin Publication Year: 2012

Uploaded File: *none*

URL: <http://goo.gl/q4io7>

**Abstract:**

Once dominant along the North American west coast, Olympia oyster (*Ostrea lurida*) populations have declined significantly since the early 1900's. Restoration efforts have encountered many problems, one of which is the slow growth of *O. lurida*. This study aims to determine the effect of photoperiod and mechanical stress, environmental factors controllable in an aquaculture setting, on *O. lurida* stress and growth physiology. Natural photoperiod and

absence of mechanical stress were expected to elicit a greater growth response. Oysters were separated into 12-hour light:12 dark or 24-hour light photoperiod treatments followed by mechanical stress or no mechanical stress. Tissue of oysters was analyzed using quantification of genes related to stress and growth. Results of stress genes indicated 12:12 photoperiod with mechanical stress induced greater stress. Growth genes implied 24-hour photoperiod with mechanical stress induced greater growth. Findings that 24-hour light was less stressful contradicted predictions that oysters would be better suited for conditions similar to natural lighting. The longer 24-hour light treatment could signal the growing season, which generally occurs in the summer months. Indications of growth in the 24-hour with stress treatment were also of interest. The results suggest that mechanical stress may play a role in stimulating growth in oysters. During the study, no growth was actually measured meaning quantification of genes only suggests possible physiological changes. Future work will aim to verify our results with real measured growth.

**Citation:**

Undergraduate Capstone Research Symposium. 2012. Effects of photoperiod and mechanical stress on Olympia oyster physiology. Seattle, WA.

**Copyright Restrictions + Other Notes:**

Journal Title: *none*

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**Title: Effects of photoperiod and mechanical stress on Olympia oyster physiology**

Type: Thesis / Dissertation abstracts    Publication Year: 2012

Uploaded File: *none*

URL: <http://goo.gl/pqyEE>

**Abstract:**

Once dominant along the North American west coast, Olympia oyster (*Ostrea lurida*) populations have declined significantly since the early 1900's. Restoration efforts have encountered many problems, one of which is the slow growth of *O. lurida*. This study aims to determine the effect of photoperiod and mechanical stress, environmental factors controllable in an aquaculture setting, on *O. lurida* stress and growth physiology. Natural photoperiod and absence of mechanical stress were expected to elicit a greater growth response. Oysters were separated into 12-hour light:12 dark or 24-hour light photoperiod treatments followed by mechanical stress or no mechanical stress. Tissue of oysters was analyzed using quantification of genes related to stress and growth. Results of stress genes indicated 12:12 photoperiod with mechanical stress induced greater stress. Growth genes implied 24-hour photoperiod with mechanical stress induced greater growth. Findings that 24-hour light was less stressful contradicted predictions that oysters would be better suited for conditions similar to natural lighting. The longer 24-hour light treatment could signal the growing season, which generally occurs in the summer months. Indications of growth in the 24-hour with stress treatment were also of interest. The results suggest that mechanical stress may play a role in stimulating growth in oysters. During the study, no growth was actually measured meaning quantification of genes only suggests possible physiological changes. Future work will aim to verify our results with real measured growth.

**Citation:**

Chi, B. 2012. Effects of photoperiod and mechanical stress on Olympia oyster physiology. FISH495 Capstone Thesis. University of Washington.

**Copyright Restrictions + Other Notes:**

Journal Title: *none*

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**Title: Katie's Notebook**

Type: Internet Resources, Topical Websites    Publication Year: 2012

Uploaded File: *none*

URL: <http://genefish.wikispaces.com/Katie's+Notebook>

**Abstract:**

Lab Notebook of undergraduate student currently working on the project

**Citation:**

Katie's Notebook. Roberts Lab Wiki. October 23, 2012. <http://genefish.wikispaces.com/Katie's+Notebook>

**Copyright Restrictions + Other Notes:**

Journal Title: *none*

**Title: Tidal Cycles**

Type: Internet Resources, Topical Websites Publication Year: 2012

Uploaded File: *none*

URL: <http://oystergen.es/blog/>

**Abstract:**

Blog

**Citation:**

Tidal Cycles. Oystergen Blog. 2012. <http://oystergen.es/blog/>

**Copyright Restrictions + Other Notes:**

Journal Title: *none*

**Title: oystergen.es**

Type: Internet Resources, Topical Websites Publication Year: 2012

Uploaded File: *none*

URL: <http://oystergen.es/olympia/>

**Abstract:**

Website

**Citation:**

The Olympia oyster (*Ostrea lurida*) is the only native oyster on the west coast of the U.S. Steven Roberts. 2012. Oystergen.es.

**Copyright Restrictions + Other Notes:**

Journal Title: *none*

**Title: Genomic resource development for shellfish of conservation concern.**

Type: Reprints from Peer-Reviewed Journals, Books, Proceedings and Other Documents Publication Year: 2013

Uploaded File: [WSG-TA\\_12-27\\_Timmins-S....n.pdf](#), 509 kb

URL: <http://onlinelibrary.wiley.com/doi/10.1111/1755-0998.12052/abstract>

**Abstract:**

Effective conservation of threatened species depends on the ability to assess organism physiology and population demography. To develop genomic resources to better understand the dynamics of two ecologically vulnerable species in the Pacific Northwest of the United States, larval transcriptomes were sequenced for the pinto abalone, *Haliotis kamtschatkana kamtschatkana*, and the Olympia oyster, *Ostrea lurida*. Based on comparative species analysis the *Ostrea lurida* transcriptome (41 136 contigs) is relatively complete. These transcriptomes represent the first significant contribution to genomic resources for both species. Genes are described based on biological function with

particular attention to those associated with temperature change, oxidative stress and immune function. In addition, transcriptome-derived genetic markers are provided. Together, these resources provide valuable tools for future studies aimed at conservation of *Haliotis kamtschatkana kamtschatkana*, *Ostrea lurida* and related species.

**Citation:**

Timmins-Schiffman, E. B., C. S. Friedman, D. C. Metzger, S. J. White, and S.B. Roberts. 2012. Genomic resource development for shellfish of conservation concern. *Molecular Ecology Resources* 13(2): 295-305. doi: 10.1111/1755-0998.12052

**Copyright Restrictions + Other Notes:**

Journal Title: *Molecular Ecology Resources*

**:: OTHER DOCUMENTS**

*No Documents Reported This Period*

**:: LEVERAGED FUNDS**

*No Leveraged Funds Reported This Period*

**:: UPDATE NARRATIVE**

Uploaded File: [Roberts\\_6976\\_update\\_na....4.pdf](#), 75 kb