2018
Undergraduate Research & Creative Activity (URECA)

Project Final Report

Within one month of project completion and no later than July 15, 2018, please provide an informative but concise (1-2pp) report that addresses the questions/items below. Please submit report, along with required project photo, to both kmjensen@alaska.edu and bbuma@alaska.edu. Bonus points :>) for additional photos.

Your Name: Vasily J. Sekerak
Your Faculty Mentor: Dr. Michael Navarro

(1) What was the original project objective or purpose?

My initial project focused on the way market squid embryo morphology can possibly be effected by ocean salinity levels during development. This was to be accomplished by testing two sets of embryos with three replicates each. These two sets would comprise a salinity level that matched the ocean conditions of Sitka sound, and a comparative salinity which would represent the low salinity levels of the inner passages of Southeast Alaska. Once the embryos hatched they would be transferred into tanks especially designed to safely contain soft tissue organisms. After several weeks of paralarval development, the squid would then be euthanized in accordance with regulations and their statoliths would be removed and analyzed for and morphological differences.

(2) With respect to your proposed project activities, what have you achieved thus far?

I estimate that I was able to accomplish half of the entire project with respect to the original project. I implemented the knowledge I gained through studying peer reviewed scientific literature and supplementary sources. I purchased the parts for the tanks systems I designed, assembled and tested a successful prototype.

(3) Please explain any departures from your original project objectives, proposed activities, and/or notable budget changes.

The primary departure occurred when I was not able to obtain any market squid embryos. I put up posters informing people we were willing to pay for any live embryos or squid. Additionally, I contacted various sources to included ADF&G and NOAA, for information on market squid or their locations. Thus, after it became clear I had missed squid season, I had to find another significant forage species to test. Hence, my mentor and I decided to go with pacific herring. They are an important species for wildlife and humans and their low returns to Auke bay intrigued me. The primary departure was the species, the secondary departure was amount of specimens. Herring have a much higher embryonic mortality rate, so a higher quantity of eggs were required which changed the number of test sets from two to four. The addition of more sets and replicates allowed me to test more salinity levels on a gradient, this way I could identify which salinities would be most testable.

(4) What is the current status of your project? If not complete, when do you anticipate completing it? Do you plan to spend any more of the remaining funding?

As it currently stands my project has achieved a working prototype of the circulatory current aquarium that I had originally proposed in the beginning. This aquarium system exists on larger scales, however I was able to draft, develop and test my own small scale version. This scaled down aquarium allows for larval stage vertebrates and invertebrates on a focused level that's optimized for smaller labs. My testing on the herring embryos is not yet complete, as I was only able to incubate then until near hatching. I wasn't able to hatch them as we did not receive our IACUC permit until the last week of the spring semester. Currently, the specimens of the second round of incubation are frozen, awaiting statoliths analysis. I desire to get new specimens, reboot and successfully incubate the original full set of herring embryos and raise them to larval stage. However, I do not think it is possible with conflicting time constraints, future academic requirements and more so my possible deployment with the National Guard.

(5) Please summarize the project outcomes and/or any tangible products that resulted (or will result) from the project.

Despite not completing the final phase of my project I was still able to make some contributions. The topic itself is relevant to the near future of our herring stocks in Southeast Alaska. I was able to find a balance in the specimen/seawater ratio that facilitated the survival of my embryo samples, paving the way for future embryo husbandry projects. It was discovered that the current method of transportation of specimens should be revisited when considering bringing fragile stages of vertebrate life into the lab. And finally I designed and implemented small tanks development seawater tanks with self-contained circular currents that can shield soft bodied organisms from self-harm against the walls of the tank.

(6) Please communicate the personal significance of your project, such as the impacts of the project on your education and experience at UAS; impacts on your future interests and outlook; how this project influenced your relationship with a faculty member; or simply use this space to provide some perspective about research & creative activities for students at UAS.

Perhaps I learned more about myself as a person and my goals during this project than I did about the subject matter. I mean to say, even though I value the experience of working in a lab research setting, I realize that intensive lab work is not my passion. Biology and conservation in general, I love, however, I lack the zeal for lab work that would make me a better research scientist. I have realized though, I very much enjoy the public outreach and education of biology. I enjoyed engaging with various organizations and discussing the topics of my research. My favorite part was designing and building the tank system, and the creative processes that go along with turning information into a prototype.

(7) Please provide a caption for your photo(s).

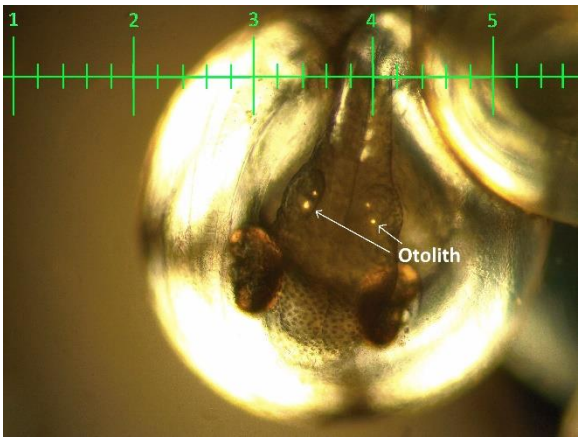

Fig 1. Seen here is a herring embryo near hatching. Using polarized light, you can see the tiny otoliths behind the two huge eyes.

Fig 2. My randomization method totaled 40 bottles. Each group of four treatments was randomized in Sections, and thus each shelf was randomized as a whole. This method guaranteed genuine randomization of all four treatments and their replicates.

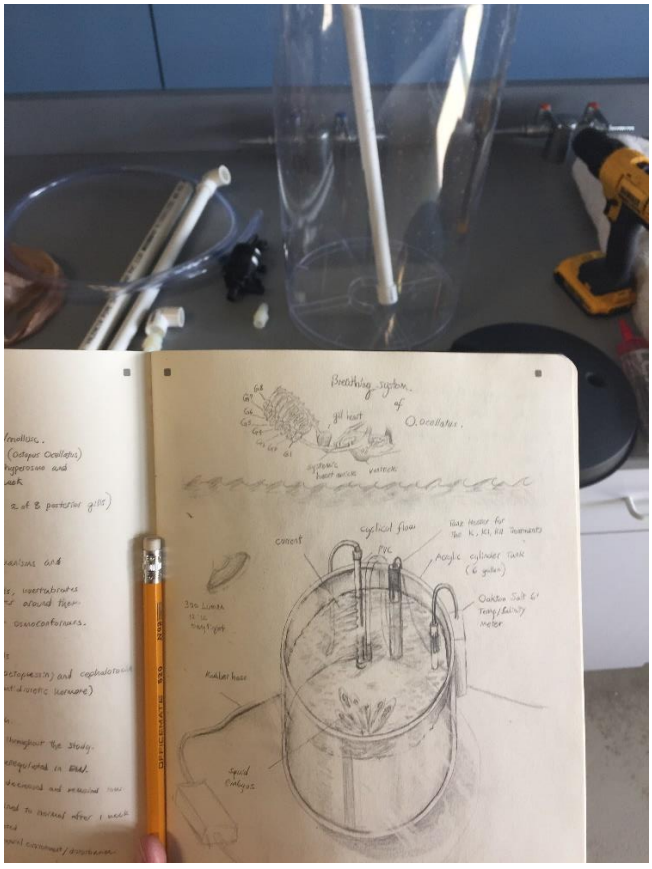

Fig 3. This is the original design for how the tank would function. I incorporated all of the information gained from researching my target species to ensure the aquarium would make a safe habitat for soft bodied larvae.

Fig 4. The mark one prototype of the original design to test the power of the water pumps to ensure it was sufficient to move the amount of water required to create a current.